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FIVE-YEAR CATALOGUE

OF

258 FUNDAMENTAL STARS,

DEDUCED FROM

OBSERVATIONS

EXTENDING FROM 1887 TO 1891,

MADE AT THE

ROYAL OBSERVATORY, GREENWICH,

UNDER THE DIRECTION OF

WILLIAM HENRY MAHONEY CHRISTIE, M.A., F.R.S.,
ASTRONOMER ROYAL,

REDUCED TO THE EPOCH

1890·0.

(*Forming Appendix to the Greenwich Observations for the Year* 1891.)

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1893.

INTRODUCTION

TO THE

GREENWICH FIVE-YEAR CATALOGUE

OF

258 FUNDAMENTAL STARS,

DEDUCED FROM OBSERVATIONS EXTENDING FROM 1887 TO 1891,
AND REDUCED TO THE EPOCH

1890·0.

This Catalogue has been formed to supply revised places of Fundamental Stars, available for determination of instrumental and clock errors, and for use in the Nautical Almanac, in the interval between two successive Greenwich General Catalogues, which it is proposed to form at intervals of ten years, so that a sufficient number of observations of each star may be accumulated. In the case of the Fundamental Stars, however, there are usually a sufficient number of observations in the course of five years to give trustworthy positions, and it has, therefore, been thought advisable, in view of possible uncertainty of proper motion when applied for more than ten years, to publish the present provisional Catalogue of Fundamental Stars based on the five years' observations 1887–1891, strengthened, where necessary, by combining with them the places of the Ten-Year Catalogue (1880·0).

The stars whose places are given in this Catalogue are—

1. Those contained in the Greenwich Clock Star Lists.

2. Circumpolar stars whose Ephemerides are published in the "Connaissance des Temps," or in the "Éphémérides des Étoiles de Culmination Lunaire et de Longitude, par M. M. Loewy."

3. Stars in the Nautical Almanac, but not in the Greenwich Clock Star Lists.

The following is the process of formation of the star places in this Catalogue.

I.—FORMATION OF RIGHT ASCENSIONS.

The determinations of Right Ascension of each star, which are to be combined in order to form the Right Ascensions in this Catalogue, are those given in the Annual Catalogues printed in the successive volumes of Greenwich Observations from 1887 to 1891.

The Right Ascensions of each Annual Catalogue depend essentially upon the Right Ascensions assumed for the stars whose transits are employed in each year to ascertain the errors of the Transit-Clock; it is necessary, therefore, in the first instance to ascertain the amount of correction required for the assumed Right Ascensions of the Clock Stars. Now it appears from the discussions of the Observations for the Position of the Ecliptic in the Greenwich Observations 1887–1891, that the Right Ascensions of the Clock Stars used in those years require the following corrections:—

		s.
1887	...	− 0·059.
1888	...	+ 0·072.
1889	...	+ 0·024.
1890	...	+ 0·092.
1891	...	+ 0·088.

The mean of these is + 0s·043; but it was considered advisable to wait for further information before making such a large correction to the Right Ascensions, and no correction for Epoch has therefore been applied to the Right Ascensions taken from the Greenwich Observations 1887 to 1891. The present Catalogue is thus referred to the Epoch of the Standard Right Ascensions of the Ten-Year Catalogue (1880·0); and also of the Nine-Year Catalogue (1872·0); for it is shown on page 9 of the Introduction to the former, that the mean difference between the two sets of Standard Right Ascensions is only 0s·0001, which is practically insensible. It should be remarked that the Mean R.A.'s of Clock Stars used during 1887 and 1888 were taken from the Standard R.A.'s of the Nine-Year Catalogue; during 1889, 1890, and 1891, from those of the Ten-Year Catalogue.

The results for the separate years as given in the Annual Catalogues were reduced to 1890·0 by using the elements given in the Ten-Year Catalogue, where Struve's Constant of Precession, and Prof. Auwers' Proper Motions are used. In the case of Sirius and Procyon, corrections for orbital motion deduced from Prof. Auwers' Papers (Publ. Astr. Gesellschaft, No. VII., and Astr. Nachr., Nos. 1373 and 3085) have been applied to the separate years in forming the Mean R.A. 1890·0.

A separate determination of the Right Ascensions of Clock Stars was made in which only those observations were included where the group of Clock Stars extended over 12 hours at least, in a similar manner precisely to that described in the Introductions to the Nine-Year and Ten-Year Catalogues, though the number of such groups is, of course, not so large. The excess of R.A. from the 12-hour groups above that of the Five-Year Catalogue was tabulated for each star and the mean formed for each hour of R.A. by combining the individual excesses with weights $= \frac{m\,n}{m+n}$, where m and n are the numbers of observations in the Twelve-Hour Groups, and in the Catalogue respectively. Similarly the corrections to the R.A.'s of the Five-Year Catalogue, as depending on the N.P.D. of the star, were formed for each 10° of N.P.D. Both sets of corrections are given in the following tables, the Resultant Corrections applicable to the R.A.'s of the Five-Year Catalogue being the algebraic sums of the two. The mean of all the corrections is less than $-{}^{s.}0005$, and though it enters into both sets, no sensible error is thus introduced by adding the two sets together.

MEAN CORRECTIONS TO RIGHT ASCENSIONS OF FIVE-YEAR CATALOGUE, DERIVED FROM A COMPARISON WITH R.A.'s OF 204 CLOCK STARS FROM 12-HOUR GROUPS.

Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of N.P.D.	Correction.	Weight.
h h	s s		h h	s s		h h	s s		° °	s	
0–1	+·010±·005	48	8—9	−·015±·007	23	16–17	+·005±·007	30	50—60	−·002	67
1–2	−·007±·005	56	9–10	−·009±·008	20	17–18	−·005±·005	44	60—70	+·002	176
2–3	−·002±·005	45	10–11	−·009±·007	26	18–19	−·001±·004	63	70—80	·000	192
3–4	−·005±·006	33	11–12	+·012±·009	16	19–20	+·002±·004	68	80—90	−·003	221
4–5	−·001±·005	47	12–13	+·005±·008	20	20–21	+·014±·006	37	90–100	−·001	146
5–6	+·010±·006	32	13–14	−·004±·005	46	21–22	−·010±·006	36	100–110	−·001	80
6–7	+·010±·006	35	14–15	−·005±·006	37	22–23	·000±·005	53	110–124	+·006	35
7–8	−·011±·006	39	15–16	+·002±·006	32	23–24	+·002±·006	31			

The probable errors appended with the sign ± have been computed by taking the probable error of a single determination of R.A. as ± $0^{s}\cdot034$.

It appears that the errors of the assumed places of the Clock Stars, originally derived from Pond's Catalogue, have been greatly diminished and are now very small.

II.—FORMATION OF MEAN NORTH POLAR DISTANCES.

The determinations of N.P.D. of each star, which are to be combined in order to form the N.P.D. in this Catalogue, are those given in the Annual Catalogues printed in the successive volumes of Greenwich Observations, 1887 to 1891, to which the sam statements apply generally as have been made for R.A., omitting all that relates to Correction for Equinox. The adopted colatitude is 38° 31′ 21″·90 throughout. The corrections required for orbital motion, in the case of Sirius and Procyon, have been deduced from Prof. Auwers' papers referred to before.

III.—EXPLANATION OF THE SEPARATE COLUMNS OF THE PRINTED CATALOGUE.

The "No." is the ordinal number of this Catalogue, the stars being arranged in order of R.A. 1890·0.

The "Star's Name" is taken from one of the following authorities, the order of preference being the order of mention of the authority below :—

1. Flamsteed's Constellation No. and Constellation, with Bayer's Letter, taken from Baily's Edition of Flamsteed, or the British Association Catalogue.

2. The No. in Bessel's *Fundamenta Astronomiæ* deduced from Bradley's Observations, referred to as "Bradley."

3. The Hour and No. in Piazzi's Catalogue, Edition 1814.

4. The No. in Groombridge's Catalogue.

For Circumpolar Stars the result of observations below the pole is shown separately.

The "Magnitude" is taken from the *Harvard Photometry* for stars contained in that work, and for other stars (marked *) from the *Bonn Durchmusterung*. The magnitude in the *Uranometria Nova Oxoniensis* is given in the Notes for all cases in which it differs by more than 0·2 magnitude from that in the *Harvard Photometry*. The magnitudes of the components of double stars, taken from Struve's *Mensuræ Micrometricæ* or other authority, are given in the Notes. In the case of Variable Stars, the limits of magnitude and the period given in the Notes are taken from Mr. Chandler's Catalogue in the *Astronomical Journal*, Nos. 179, 180.

The next six columns consist of three pairs, the first of each pair referring to the observations in 1887–1891, immediately under discussion, and the second to the Ten-Year Catalogue.

The first pair gives the "Mean Date" expressed in years and decimals of a year reckoned from 1800.

The second pair (columns 6 and 7) gives the "Number of Observations," being the aggregate of all the observations in the different years, above and below the Pole respectively, in column 6, and the aggregate of all observations in column 7.

The third pair (columns 8 and 9) gives the seconds of Mean R.A. formed in the manner already described.

In forming the adopted Mean R.A. 1890·0 the following rules have been observed :—

(1.) In all cases where the total number of observations in the years 1887–1891 is ten or more, the mean of these observations is the adopted Mean R.A., equal weight being assigned to observations above and below the Pole.

(2.) When there are five to nine observations in the period 1887–1891, the adopted Mean R.A. is formed by combining these with the result brought up from the Ten-Year Catalogue, *giving weight $\frac{1}{4}$ to each observation in the latter.*

(3.) When there are less than five observations in the period 1887–1891, *weight* $\frac{1}{2}$ is given to each observation in the Ten-Year Catalogue in combining the two means.

Assuming that there are on the average twice as many observations of a star in the Ten-Year Catalogue as in the Five-Year Catalogue, this is equivalent to giving the Ten-Year Catalogue weight $\frac{1}{2}$ on the average when there are from five to nine observations in the Five-Year Catalogue, and to taking the simple mean between the Five-Year and Ten-Year (on the average) when there are less than five observations in the former. If we assume that the probable error of one observation of R.A. is $\pm 0^{s}{\cdot}034$, and that the Ten-Year Catalogue deduced place for 1890·0 is affected by a probable error of proper motion, or other systematic error represented by x, and express the condition that the result of seven observations in the Five-Year Catalogue should have double the weight of 14 observations in the Ten-Year Catalogue ; then $x = \pm {}^{s}{\cdot}016$; or the method of combination adopted is equivalent to assuming that the results of the Ten-Year Catalogue reduced to 1890·0 are affected by a probable error of proper motion or other systematic error amounting to $\pm 0^{s}{\cdot}016$.

The "Annual Precession 1890·0" for stars beyond 5° from the Pole has been formed by applying to the Precession in the Ten-Year Catalogue the proportional part of the "Secular Variation 1880·0" to reduce it to 1890·0.

The "Secular Variation 1890·0" is the same as that given in the Ten-Year Catalogue, except for stars within 5° of the Pole. For these latter stars both the Annual

Precession and the Secular Variation have been computed by the help of Folie's "Douze Tables pour le calcul des reductions stellaires," in which Struve's Constant of Precession is used. The Precession is given by the formula—

$$3^{s}\cdot 0725 + 1^{s}\cdot 3369\ [\log. = 0\cdot 12611]\ \sin \text{R.A.}\ \cot. \text{N.P.D.}$$

and the Secular Variation by the formula—

$$A + B \cot. \text{N.P.D.} + C \cot.^2 \text{N.P.D.}$$

where—

$$A = 0^{s}\cdot 00190 + 0^{s}\cdot 00650 \sin 2\ \text{R.A.}$$

$$B = -\ 0^{s}\cdot 00057 \sin \text{R.A.} + 0^{s}\cdot 02987 \cos. \text{R.A.}$$

$$C = +\ 0^{s}\cdot 01300 \sin 2\ \text{R.A.}$$

The second term of the precession is readily computed from these tables, and the quantities A, B, C, are therein tabulated for every minute of R.A. These formulæ correspond essentially with those used in previous Catalogues, but the method of computation is simpler.

The "Annual Proper Motion 1890·0" has been taken from Prof. Auwers' "Neue Reduction der Bradleyschen Beobachtungen," or his "Catalog der Fundamental Sterne," for stars contained in either of those works. The authority for other Proper Motions is given in the Notes.

To the columns relating to N.P.D. the same remarks generally apply as in the case of R.A., except that in combining observations above and below Pole the weights mentioned below were used in forming the means. For stars whose N.P.D does not exceed 15° the observations above and below Pole are considered equally good; from N.P.D. 15° to N.P.D. 36°, those below Pole have the weight $\frac{2}{3}$ for each observation; from N.P.D. 36° to N.P.D. 41° those below Pole have the weight $\frac{1}{2}$: beyond 41° N.P.D. the observations below Pole are not used, and in the case of those stars observed below Pole only the mean result is enclosed within brackets.

The Annual Precession and Secular Variation for stars not within 5° of the Pole have been formed as explained above; for the stars within 5° of the Pole they have been computed by the help of Folie's Tables referred to above. The Precession is given by the formula—

$$- 20''{\cdot}0530 \cos \text{R.A.}$$

which is taken directly from the Tables, and the Secular Variation by the formula—

$$A^1 + B^1 \cot. \text{N.P.D.}$$

where—

$$A^1 = + 0''{\cdot}0086 \cos \text{R.A.} + 0''{\cdot}4480 \sin \text{R.A.}$$

$$B^1 = + 0''{\cdot}1950 \sin^2 \text{R.A.}$$

The quantities A^1 and B^1 are given directly in the Tables for every minute of R.A.

IV.—Comparison of the Places of Clock-Stars in R.A. and N.P.D. from Observations made in the Years 1887–1891 with those of the Ten-Year Catalogue.

The following tables give the mean excess of R.A. and N.P.D. from the Five-Year Catalogue over those deduced from the Ten-Year Catalogue, for each hour of R.A., and for every 10° of N.P.D., weights being assigned to the individual excesses according to the formula $\frac{mn}{m + n}$, where m and n are the numbers of observations in the two Catalogues respectively.

EXCESS OF R.A.'s OF CLOCK STARS FROM FIVE-YEAR CATALOGUE ABOVE THOSE OF THE TEN-YEAR CATALOGUE REDUCED TO 1890·0 FOR EVERY HOUR OF R.A. AND EVERY 10° OF N.P.D.

Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of N.P.D.	Correction.	Weight.
h h	s s		h h	s s		h h	s s		° °	s	
0–1	+·005±·003	147	8–9	−·014±·005	55	16–17	−·008±·004	74	50–60	+·005	156
1–2	·000±·003	133	9–10	−·006±·004	68	17–18	−·009±·003	95	60–70	+·001	461
2–3	+·005±·003	111	10–11	+·007±·004	87	18–19	+·003±·003	150	70–80	·000	525
3–4	−·007±·003	95	11–12	−·005±·004	74	19–20	+·006±·003	157	80–90	+·001	601
4–5	·000±·004	88	12–13	+·004±·004	75	20–21	+·004±·003	109	90–100	−·005	339
5–6	+·004±·004	87	13–14	+·001±·003	117	21–22	−·010±·004	90	100–110	−·002	227
6–7	−·002±·003	99	14–15	+·008±·004	89	22–23	−·016±·003	125	110–124	−·006	89
7–8	+·001±·003	107	15–16	·000±·004	87	23–24	+·002±·004	79			

EXCESS OF N.P.D.'s OF 211 CLOCK STARS FROM FIVE-YEAR CATALOGUE ABOVE THOSE OF THE TEN-YEAR CATALOGUE REDUCED TO 1890·0 FOR EVERY HOUR OF R.A. AND EVERY 10° OF N.P.D.

Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of N.P.D.	Correction.	Weight.
h h	"		h h	"		h h	"		° °	"	
0—1	−0·09	113	8— 9	+0·13	47	16—17	+0·13	87	50— 60	+0·13	137
1—2	0·00	90	9—10	−0·04	74	17—18	−0·22	130	60— 70	−0·18	407
2—3	−0·14	91	10—11	−0·09	78	18—19	+0·12	148	70— 80	−0·09	499
3—4	−0·18	76	11—12	+0·03	93	19—20	−0·07	147	80— 90	−0·04	531
4—5	−0·15	64	12—13	−0·05	66	20—21	−0·10	93	90—100	−0·02	327
5—6	−0·29	65	13—14	+0·11	96	21—22	−0·13	84	100—110	+0·01	205
6—7	−0·15	79	14—15	+0·05	129	22—23	−0·20	103	110—124	+0·13	79
7—8	+0·05	81	15—16	0·00	94	23—24	−0·07	57			

V.—COMPARISON OF THE PLACES OF CIRCUMPOLAR STARS AS OBSERVED ABOVE AND BELOW THE POLE FROM OBSERVATIONS MADE IN THE YEARS 1887–1891.

The following tables show the mean excess of R.A. and of N.P.D. above Pole for all stars in the Five-Year Catalogue, of which observations were made both above and below the Pole. The star is designated by its No. taken from the Five-Year Catalogue. The figures on the same line as the No. refer to the observations above the Pole, those on the next line to the observations below. The excess of R.A. is multiplied by sin N.P.D. in all cases, to reduce it to equatorial interval. The weights assigned to each star are computed as follows :—For R.A. if m and n be the number of observations above and below the Pole respectively, the weight assigned is $\frac{4\,mn}{m + n + \frac{1}{5}\,mn}$. The maximum weight for any star is thus 20, which corresponds to an infinite number of observations above and below the Pole, and the expression is equivalent to that for N.P.D. for stars at about 30° from the Pole. For N.P.D. the weights used are determined by use of the "Probable Errors of Greenwich Observations in Zenith Distance," given by Mr. Stone in the *Monthly Notices of the Royal Astronomical Society* for 1869 June 11, page 324. Putting n for the number of observations of a star above Pole, e for the probable error of one observation ; n_1 and e_1 the similar quantities for the observations below Pole ; e_0 the probable systematic error affecting all observations of the same star, and depending on outstanding division error, uncertainty in the constant of refraction, &c. ; the formula employed to determine the weight to be given to that star is $\frac{2\,nn_1}{n_1e^2 + ne_1^2 + 2\,nn_1e_0^2}$, or assuming $e_0^2 = \frac{1}{10}\,e^2$, which would make $e_0 = 0''\cdot16$, the weight becomes $\frac{2\,nn_1}{n_1e^2 + ne_1^2 + \frac{1}{5}\,nn_1e^2}$, which has been adopted for use in this investigation.

TABLE OF THE EXCESS OF MEAN R.A. AND MEAN N.P.D. ABOVE POLE, ARRANGED IN ORDER OF RIGHT ASCENSION.

Star's No.	Mean R.A. 1890·0.	Mean Date. 1800 +	No. of Obs.	Excess of R.A. above Pole × sin N.P.D.	Weight.	Mean N.P.D. 1890·0.	Mean Date, 1800 +	No. of Obs.	Excess of N.P.D. above Pole.	Weight.
	h m s			s		° ′ ″			″	
7	0. 34. 16·000 15·940	89·31 89·98	2 3	+ 0·033	4	34. 3. 58·28 59·07	89·81 89·98	3 3	− 0·79	5
12	0. 53. 48·194 48·153	89·83 90·13	34 38	+ 0·003	16	4. 20. 0·21 0·42	89·66 90·25	35 34	− 0·21	29
16	1. 18. 30·679 30·680	89·25 89·48	230 224	0·000	19	1. 16. 41·30 41·76	89·47 89·53	296 330	− 0·46	38
22	1. 46. 28·909 28·952	91·36 91·45	3 1	− 0·019	3	26. 52. 19·50 18·46	91·51 90·77	4 3	+ 1·04	6
37	3. 16. 28·097 28·202	91·00 88·35	2 1	− 0·068	2	40. 31. 51·36 51·51	91·00 88·35	2 1	− 0·15	1
46	4. 2. 13·562 13·233	90·24 90·35	34 47	+ 0·027	16	4. 44. 8·37 8·86	90·59 90·35	13 47	− 0·49	25
56	5. 8. 33·578 33·847	91·38 88·12	3 3	− 0·188	5	44. 6. 53·93 53·87	91·08 88·12	2 3	+ 0·06	2
76	6. 48. 46·624 46·016	89·84 89·10	25 46	+ 0·031	15	2. 46. 54·40 54·88	89·38 89·49	88 177	− 0·48	36
90	7. 46. 51·175 51·670	90·30 90·48	49 104	− 0·009	17	1. 2. 25·81 26·31	90·13 90·56	36 79	− 0·50	32
98	8. 51. 40·489 40·504	88·19 87·64	3 1	− 0·010	3	41. 31. 37·22 38·99	88·19 87·64	3 1	− 1·77	1
102	9. 21. 21·791 21·678	89·92 90·88	19 15	+ 0·016	13	8. 11. 17·96 17·78	89·97 90·90	23 22	+ 0·18	25
117	10. 56. 56·212 56·233	89·61 89·80	3 2	− 0·010	4	27. 39. 19·64 20·16	89·40 89·80	8 2	− 0·52	5
122	11. 24. 52·078 52·208	88·37 89·80	1 3	− 0·045	3	20. 3. 43·30 42·63	89·32 89·80	8 9	+ 0·67	14
126	11. 48. 2·563 2·611	90·31 91·30	5 2	− 0·025	4	35. 41. 37·28 37·28	90·31 91·30	5 2	0·00	4
131	12. 14. 22·157 20·815	90·07 89·96	48 54	+ 0·039	17	1. 41. 24·97 25·45	90·09 89·89	41 44	− 0·48	31
151	14. 1. 24·658 24·776	88·01 90·69	5 3	− 0·050	5	25. 5. 53·86 53·83	87·78 89·27	14 9	+ 0·03	15
159						15. 23. 41·61 42·14	89·40 88·93	17 4	− 0·53	11
164	15. 12. 50·203 49·427	90·24 90·47	53 30	+ 0·032	16	2. 20. 41·43 41·54	90·17 90·45	43 22	− 0·11	28
170	15. 47. 59·665 59·942	89·22 88·78	4 4	− 0·057	6	11. 52. 2·60 2·33	89·46 89·01	12 7	+ 0·27	15
175						28. 14. 12·29 11·78	88·36 90·88	3 2	+ 0·51	4

TABLE OF THE EXCESS OF MEAN R.A. AND MEAN N.P.D., &c.—*continued.*

Star's No.	Mean R.A. 1890·0.	Mean Date, 1800 +	No. of Obs.	Excess of R.A. above Pole × sin N.P.D.	Weight.	Mean N.P.D. 1890·0.	Mean Date, 1800 +	No. of Obs.	Excess of N.P.D. above Pole.	Weight.
	h m s			s		° ′ ″			″	
182	16. 57. 14·900	87·94	3	— 0·100	4	7. 46. 57·53	89·32	19	+ 0·47	16
	15·639	91·03	2			57·06	89·40	6		
187	17. 27. 56·806	88·53	8	+ 0·060	3	37. 37. 1·39	88·47	8	+ 0·01	2
	56·708	87·96	1			1·38	87·96	1		
195	18. 7. 47·598	88·98	59	+ 0·015	16	3. 23. 17·92	89·32	171	— 0·49	34
	47·321	90·03	30			18·41	89·26	61		
209	19. 33. 35·318	89·39	65	+ 0·029	15	1. 1. 59·02	89·29	145	— 0·49	35
	33·705	89·79	18			59·51	89·27	82		
220	20. 33. 44·984	90·04	59	— 0·044	15	8. 56. 24·06	89·97	65	— 0·12	28
	45·276	90·11	19			24·18	90·05	24		
230	21. 15. 57·172	89·21	10	+ 0·019	9	27. 52. 49·00	89·17	16	— 0·96	13
	57·131	88·71	8			49·96	88·83	8		
232	21. 21. 28·509	89·93	43	+ 0·030	11	3. 25. 9·19	89·92	28	— 0·75	17
	28·012	90·18	7			9·94	90·16	6		
234	21. 27. 14·281	88·92	2	— 0·059	4	19. 55. 19·51	88·77	6	+ 0·04	11
	14·455	89·82	3			19·47	90·09	6		
243	22. 21. 58·914	90·21	56	+ 0·005	16	4. 26. 45·09	89·94	36	— 0·52	25
	58·833	90·21	27			45·61	89·78	17		
253	23. 27. 49·643	90·23	56	+ 0·019	16	3. 17. 57·42	89·92	45	— 0·08	30
	49·315	89·94	35			57·50	89·75	35		
255	23. 34. 49·740	90·86	2	— 0·076	2	12. 58. 52·63	89·42	9	— 0·32	19
	50·078	87·34	1			52·95	88·90	15		

The weighted means for each $6^{h.}$ of R.A. are shown in the following table, the corresponding numbers for the Ten-Year Catalogue, as found from the table on page 46 of its Introduction, being added for comparison.

Limits of R.A.	Mean Excess of R.A. above Pole × sin N.P.D.		Mean Excess of N.P.D. above Pole.	
	Five-Year.	Ten-Year.	Five-Year.	Ten-Year.
h h	s	s	″	″
0—6	— ·007	— ·029	— 0·32	— 0·10
6—12	+ ·004	— ·003	— 0·21	— 0·05
12—18	+ ·007	— ·026	— 0·11	— 0·08
18—24	+ ·005	— ·009	— 0·39	— 0·18
Mean ...	+ ·002	— ·017	— 0·26	— 0·10

These stars may also be arranged in order of N.P.D. as follows :—

Star's No.	Approximate R.A.	Excess of R.A. above Pole × sin N.P.D.	Weight.	Approximate N.P.D.	Excess of N.P.D. above Pole.	Weight.
	h m	s		° ′	″	
209	19. 34	+ 0·029	15	1. 2	− 0·49	35
90	7. 47	− 0·009	17	1. 2	− 0·50	32
16	1. 19	0·000	19	1. 17	− 0·46	38
131	12. 14	+ 0·039	17	1. 41	− 0·48	31
164	15. 13	+ 0·032	16	2. 21	− 0·11	28
76	6. 49	+ 0·031	15	2. 47	− 0·48	36
253	23. 28	+ 0·019	16	3. 18	− 0·08	30
195	18. 8	+ 0·015	16	3. 23	− 0·49	34
232	21. 21	+ 0·030	11	3. 25	− 0·75	17
12	0. 54	+ 0·003	16	4. 20	− 0·21	29
243	22. 22	+ 0·006	16	4. 27	− 0·52	25
46	4. 2	+ 0·027	16	4. 44	− 0·49	25
182	16. 57	− 0·100	4	7. 47	+ 0·47	16
102	9. 21	+ 0·016	13	8. 11	+ 0·18	25
220	20. 34	− 0·044	15	8. 56	− 0·12	28
170	15. 48	− 0·057	6	11. 52	+ 0·27	15
255	23. 35	− 0·076	2	12. 59	− 0·32	19
159	14. 51	......	...	15. 24	− 0·53	11
234	21. 27	− 0·059	4	19. 55	+ 0·04	11
122	11. 25	− 0·045	3	20. 4	+ 0·67	14
151	14. 1	− 0·050	5	25. 6	+ 0·03	15
22	1. 46	− 0·019	3	26. 52	+ 1·04	6
117	10. 57	− 0·010	4	27. 39	− 0·52	5
230	21. 16	+ 0·019	9	27. 53	− 0·96	13
175	16. 22	......	...	28. 14	+ 0·51	4
7	0. 34	+ 0·033	4	34. 4	− 0·79	5
126	11. 48	− 0·025	4	35. 42	0·00	4
187	17. 28	+ 0·060	3	37. 37	+ 0·01	2
37	3. 16	− 0·068	2	40. 32	− 0·15	1
98	8. 52	− 0·010	3	41. 32	− 1·77	1
56	5. 9	− 0·188	5	44. 7	+ 0·06	2

Taking the weighted means of the six groups we get the following numbers, corresponding quantities from the Ten-Year Catalogue being added for comparison on two methods. In columns marked (1.) the result is deduced by selecting actually the same stars as those of the Five-Year Catalogue from the table on pages 46–54 of the

Introduction to the Ten-Year Catalogue; in the columns marked (2.) the result for the particular N.P.D. is inferred from the collected results on page 55 of that Introduction, except in the case of the first group.

Group.	Approximate N.P.D.	Excess of R.A. above Pole × sin N.P.D.			Excess of N.P.D. above Pole.		
		Five-Year.	Ten-Year. (1.)	Ten-Year. (2.)	Five-Year.	Ten-Year. (1.)	Ten-Year. (2.)
	°	s	s	s	"	"	"
1	1. 29	+ ·017	+ ·010	(+ ·010)	− 0·42	− 0·48	(− 0·48)
2	3. 27	+ ·019	+ ·017	+ ·015	− 0·64	− 0·42	− 0·37
3	6. 29	− ·005	− ·068	− ·016	− 0·14	− 0·37	− 0·02
4	16. 3	− ·057	+ ·005	+ ·005	+ 0·03	+ 0·09	+ 0·13
5	27. 9	− ·008	− ·008	− ·007	− 0·15	− 0·36	− 0·26
6	38. 56	− ·043	+ ·005	− ·025	− 0·38	− 0·51	− 0·57

The evidence, so far as it goes, seems to show that the Systematic Errors of the Five-Year Catalogue are nearly the same as those of the Ten-Year Catalogue, especially in N.P.D.

W. H. M. CHRISTIE.

Royal Observatory, Greenwich,
1893 August 10.

GREENWICH

FIVE-YEAR CATALOGUE

OF

258 FUNDAMENTAL STARS

FOR

1890·0

FROM OBSERVATIONS

MADE AT THE

ROYAL OBSERVATORY, GREENWICH,

1887 to 1891.

NOTE.

STAR'S NAME.

The "Star's Name" adopted in this Catalogue is taken from one of the following authorities, the order of preference being the order of mention of the authority below :—

1. Flamsteed's constellation No. and constellation, with Bayer's letter, taken from Baily's edition of Flamsteed, or from the British Association Catalogue. When the description in Baily's Flamsteed (B. F.) differs from that in the British Association Catalogue (B. A. C.) the difference is mentioned in the Notes.
2. The No. in Bessel's *Fundamenta Astronomiæ* deduced from Bradley's observations, referred to as "Bradley."
3. The Hour and No. in Piazzi's Catalogue, edition 1814.
4. The No. in Groombridge's Catalogue.

MAGNITUDE.

The magnitude is taken from the *Harvard Photometry* for stars contained in that work, and for other stars (marked *) from the *Bonn Durchmusterung*. For the few remaining stars (marked †) the authority for the magnitude is given in the Notes. The magnitude in the *Uranometria Nova Oxoniensis* is given in the Notes for all cases in which it differs by more than 0·2 magnitude from that in the *Harvard Photometry*.

The magnitudes of the components of double stars, taken from Struve's *Mensuræ Micrometricæ* or other authority, are given in the Notes.

In the case of variable stars the limits of magnitude and the period given in the Notes are taken from Mr. Chandler's Catalogue in the *Astronomical Journal*, Nos. 179, 180.

PROPER MOTIONS.

The proper motions are taken from Professor Auwers' "Neue Reduction der Bradleyschen Beobachtungen" or his "Catalog der Fundamental Sterne" for stars contained in either of those works. The authority for other proper motions is given in the Notes.

No.	Star's Name.	Mag.	Mean Date. 1800+ 1887 to 1891.	Mean Date. 1800+ 10-Year Catalogue.	No. of Observations. 1887 to 1891.	No. of Observations. 10-Year Catalogue.	Seconds of Mean R.A. 1890·0 deduced from 1887 to 1891.	Seconds of Mean R.A. 1890·0 deduced from 10-Year Catalogue.	Adopted Mean R.A. 1890·0.	Annual Precession. 1890·0.	Secular Variation. 1890·0.	Annual Proper Motion. 1890·0.
							s	s	h m s	s	s	s
1	21 Andromedæ .... α	2·1	89·06	82·06	36	69	42·077	42·082	0. 2. 42·077	+ 3·0810	+ 0·0183	+ 0·0095
2	88 Pegasi .... γ	3·0	89·60	82·68	16	38	34·245	34·235	0. 7. 34·245	+ 3·0839	+ 0·0101	— 0·0007
3	8 Ceti .... ι	3·6	89·88	82·21	11	22	49·340	49·361	0. 13. 49·340	+ 3·0591	— 0·0023	— 0·0032
4	44 Piscium	5·8	89·44	83·32	13	30	45·793	45·792	0. 19. 45·793	+ 3·0752	+ 0·0037	— 0·0028
5	12 Ceti	6·2	89·69	83·17	23	28	25·458	25·453	0. 24. 25·458	+ 3·0611	+ 0·0009	— 0·0003
6	30 Andromedæ .... ϵ	4·6	89·70	82·77	25	51	44·533	44·534	0. 32. 44·533	+ 3·1768	+ 0·0209	— 0·0184
7	18 Cassiopeiæ .... α	Var.	89·31	82·63	2	33	16·000	15·956	0. 34. 15·959	+ 3·3670	+ 0·0555	+ 0·0035
	„ S.P.........		89·98		3		15·940					
8	16 Ceti .... β	2·1	89·29	82·38	16	42	4·055	4·035	0. 38. 4·055	+ 2·9982	— 0·0054	+ 0·0147
9	63 Piscium .... δ	4·6	89·39	82·46	26	48	58·459	58·458	0. 42. 58·459	+ 3·1030	+ 0·0079	+ 0·0035
10	20 Ceti	5·0	89·57	83·26	17	30	23·123	23·101	0. 47. 23·123	+ 3·0642	+ 0·0036	— 0·0022
11	37 Andromedæ .... μ	3·9	89·05	82·86	15	28	38·795	38·752	0. 50. 38·795	+ 3·3007	+ 0·0305	+ 0·005
12	2 Ursæ Minoris	4·5	89·83	84·72	34	14	48·194	47·688	0. 53. 48·173	+ 7·1772	+ 1·4116	+ 0·0686
	„ S.P.....		90·13		38		48·153					
13	71 Piscium .... ϵ	4·5	89·40	82·57	20	58	13·999	14·005	0. 57. 13·999	+ 3·1148	+ 0·0087	— 0·0070
14	43 Andromedæ .... β	2·2	89·66	82·63	39	91	34·361	34·353	1. 3. 34·361	+ 3·3292	+ 0·0286	+ 0·0144
15	86 Piscium .... ζ^1	4·2	89·11	84·31	27	40	58·966	58·986	1. 7. 58·966	+ 3·1204	+ 0·0091	+ 0·0075
16	1 Ursæ Minoris .... α	2·2	89·25	82·26	230	1013	30·679	29·878	1. 18. 30·680	+23·1993	+17·7732	+ 0·1137
	„ S.P. ...		89·48		224		30·680					
17	45 Ceti .... θ	3·8	90·75	80·90	11	24	31·453	31·444	1. 18. 31·453	+ 3·0034	+ 0·0019	— 0·0068
18	99 Piscium .... η	3·7	89·65	81·85	30	78	35·771	35·761	1. 25. 35·771	+ 3·2012	+ 0·0142	— 0·0002
19	106 Piscium .... ν	4·7	89·56	82·43	44	71	42·347	42·350	1. 35. 42·347	+ 3·1193	+ 0·0091	— 0·0034
20	110 Piscium .... o	4·4	89·68	81·70	23	45	35·021	35·032	1. 39. 35·021	+ 3·1576	+ 0·0111	+ 0·0029
21	55 Ceti .... ζ	3·9	89·08	79·91	5	6	1·781	1·830	1. 46. 1·795	+ 2·9578	+ 0·0023	+ 0·0003
22	45 Cassiopeiæ .... ϵ	3·6	91·36	80·86	3	10	28·909	29·015	1. 46. 28·973	+ 4·2546	+ 0·0994	+ 0·0036
	„ S.P.........		91·45		1		28·952					
23	6 Arietis .... β	2·8	89·13	81·80	21	69	33·745	33·745	1. 48. 33·745	+ 3·2977	+ 0·0183	+ 0·0050
24	57 Andromedæ .... γ^1	3·0	90·43	80·77	4	32	8·763	8·796	1. 57. 8·789	+ 3·6572	+ 0·0393	+ 0·0021
25	13 Arietis .... α	2·0	89·52	81·28	39	80	58·312	58·302	2. 0. 58·312	+ 3·3574	+ 0·0203	+ 0·0127
26	65 Ceti .... ξ^1	4·5	89·57	81·51	19	28	10·102	10·127	2. 7. 10·102	+ 3·1757	+ 0·0116	— 0·0032
27	67 Ceti	5·5	90·88	82·29	6	34	29·778	29·753	2. 11. 29·763	+ 2·9843	+ 0·0050	+ 0·0036
28	73 Ceti .... ξ^2	4·4	89·64	82·07	20	40	18·565	18·573	2. 22. 18·565	+ 3·1814	+ 0·0116	+ 0·0011
29	78 Ceti .... ν	4·9	88·73	82·24	15	33	6·045	6·030	2. 30. 6·045	+ 3·1453	+ 0·0103	— 0·0051
30	82 Ceti .... δ	4·1	89·48	81·87	16	36	50·607	50·607	2. 33. 50·607	+ 3·0704	+ 0·0081	+ 0·0004
31	86 Ceti .... γ^2	3·0	89·88	81·64	12	3	35·989	35·978	2. 37. 35·989	+ 3·1135	+ 0·0094	— 0·0114
32	43 Arietis .... σ	5·5	89·34	82·86	9	39	25·109	25·103	2. 45. 25·106	+ 3·3031	+ 0·0150	— 0·0002

2. The magnitude given in the *Uranometria Nova Oxoniensis* is 2·5.
7. The limits of magnitude are 2·2 and 2·8; the period irregular.
9. The magnitude given in the *Uranometria Nova Oxoniensis* is 4·3.
13. The magnitude given in the *Uranometria Nova Oxoniensis* is 4·2.

6. The magnitude given in the *Uranometria Nova Oxoniensis* is 4·3.
8. The magnitude given in the *Uranometria Nova Oxoniensis* is 2·4.
11. Authority for proper motion in R.A.: Mem. R.A.S., Vol. XIX.

Mean Date. 1800+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				″	″	° ′ ″	″	″	″		
89·41	81·65	34	42	0·61	0·86	61. 31. 0·61	−20·052	+ 0·013	+ 0·156	21 Andromedæ ....α	1
90·58	82·72	19	32	40·96	41·35	75. 25. 40·96	−20·043	+ 0·022	+ 0·013	88 Pegasi..................γ	2
89·74	83·20	14	20	1·82	2·20	99. 26. 1·82	−20·016	+ 0·035	+ 0·032	8 Ceti ....ι	3
90·02	84·19	10	30	10·83	10·66	88. 40. 10·83	−19·979	+ 0·046	+ 0·011	44 Piscium	4
89·95	83·91	23	26	55·24	55·07	94. 33. 55·24	−19·939	+ 0·055	+ 0·009	12 Ceti	5
90·03	81·45	15	25	7·84	8·54	61. 17. 7·84	−19·849	+ 0·073	+ 0·251	30 Andromedæ ....ε	6
89·81 89·98	82·44	3 3	31	58·28 59·07	58·30	34. 3. 58·43	−19·830	+ 0·080	+ 0·038	18 Cassiopeiæ.............α „ S.P.	7
89·81	83·22	14	25	26·38	26·17	108. 35. 26·38	−19·778	+ 0·080	− 0·034	16 Ceti....... ....β	8
90·11	82·35	14	39	49·86	49·75	83. 0. 49·86	−19·702	+ 0·092	+ 0·037	63 Piscium ....δ	9
89·40	83·63	18	29	30·43	30·39	91. 44. 30·43	−19·626	+ 0·099	+ 0·009	20 Ceti	10
89·50	82·72	9	28	50·61	50·78	52. 5. 50·69	−19·566	+ 0·113	− 0·049	37 Andromedæ ....μ	11
89·66 90·25	85·19	35 34	27	0·21 0·42	0·42	4. 20. 0·31	−19·504	+ 0·252	+ 0·010	2 Ursæ Minoris .... „ S.P....	12
89·42	82·89	10	47	8·97	8·54	82. 42. 8·97	−19·431	+ 0·120	− 0·039	71 Piscium ....ε	13
88·96	82·21	22	52	46·19	45·89	54. 57. 46·19	−19·287	+ 0·140	+ 0·084	43 Andromedæ ....β	14
88·91	84·23	13	30	24·16	23·78	83. 0. 24·16	−19·178	+ 0·140	+ 0·051	86 Piscium...............ζ[1]	15
89·47 89·53	81·98	296 330	1433	41·30 41·76	41·63	1. 16. 41·54	−18·889	+ 1·146	+ 0·002	1 Ursæ Minoris ......α „ S.P....	16
91·33	81·08	4	11	4·74	4·41	98. 45. 4·54	−18·889	+ 0·154	+ 0·196	45 Ceti......................θ	17
90·87	81·03	14	34	17·38	17·52	75. 13. 17·38	−18·671	+ 0·177	+ 0·003	99 Piscium ....η	18
89·57	84·08	42	42	9·58	9·42	85. 4. 9·58	−18·330	+ 0·191	− 0·005	106 Piscium ....ν	19
89·72	83·42	25	28	46·11	46·52	81. 23. 46·11	−18·190	+ 0·200	− 0·058	110 Piscium ....ο	20
89·02	80·69	7	8	43·69	43·97	100. 52. 43·75	−17·945	+ 0·200	+ 0·028	55 Ceti......................ζ	21
91·51 90·77	81·33	4 3	40	19·50 18·46	19·81	26. 52. 19·54	−17·929	+ 0·283	+ 0·022	45 Cassiopeiæ ....ε „ S.P.	22
89·31	82·57	26	66	47·80	48·11	69. 43. 47·80	−17·845	+ 0·226	+ 0·102	6 Arietis ....β	23
90·43	80·66	4	32	54·07	54·16	48. 11. 54·14	−17 490	+ 0·267	+ 0·051	57 Andromedæ ....γ[1]	24
89·58	82·46	25	72	29·03	29·30	67. 3. 29·03	−17·324	+ 0·253	+ 0·134	13 Arietis ....α	25
89·29	83·60	18	23	11·20	10·65	81. 40. 11·20	−17·045	+ 0·250	+ 0·001	65 Ceti......................ξ[1]	26
91·02	82·54	12	15	46·30	46·04	96. 55. 46·30	−16·842	+ 0·243	+ 0·109	67 Ceti	27
89·62	83·03	19	25	0·33	0·17	82. 2. 0·33	−16·309	+ 0·276	+ 0·001	73 Ceti ....ξ[2]	28
89·72	82·44	15	17	13·53	14·08	84. 53. 13·53	−15·903	+ 0·285	+ 0·028	78 Ceti ....ν	29
89·80	82·67	13	19	46·52	47·32	90. 8. 46·52	−15·702	+ 0·285	+ 0·007	82 Ceti......................δ	30
90·00	82·57	13	14	41·35	41·84	87. 13. 41·35	−15·496	+ 0·294	+ 0·156	86 Ceti ....γ[2]	31
89·97	83·08	12	28	17·93	18·08	75. 22. 17·93	−15·053	+ 0·324	+ 0·039	43 Arietis ....σ	32

15. The magnitude given is taken from Struve's *Mensuræ Micrometricæ*.
24. The magnitude is taken from Struve's *Mensuræ Micrometricæ*.
31. The magnitude given is taken from Struve's *Mensuræ Micrometricæ*.
21. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·5.
27. The magnitude given in the *Uranometria Nova Oxoniensis* is 5·8.

No.	Star's Name.	Mag.	Mean Date. 1800+ 1887 to 1891.	Mean Date. 1800+ 10-Year Catalogue.	No. of Observations. 1887 to 1891.	No. of Observations. 10-Year Catalogue.	Seconds of Mean R.A. 1890·0 deduced from 1887 to 1891.	Seconds of Mean R.A. 1890·0 deduced from 10-Year Catalogue.	Adopted Mean R.A. 1890·0.	Annual Precession. 1890·0.	Secular Variation. 1890·0.	Annual Proper Motion. 1890·0.
							s	s	h m s	s	s	s
33	48 Arietis ε	4·6	88·81	81·43	12	34	55·273	55·268	2. 52. 55·273	+ 3·4221	+ 0·0184	— 0·0025
34	92 Ceti α	2·7	90·05	82·23	11	34	31·718	31·698	2. 56. 31·718	+ 3·1320	+ 0·0098	— 0·0029
35	57 Arietis δ	4·5	89·35	82·28	13	41	20·265	20·287	3. 5. 20·265	+ 3·4114	+ 0·0171	+ 0·0095
36	61 Arietis τ^1	5·2	90·39	83·74	9	34	52·512	52·535	3. 14. 52·524	+ 3·4531	+ 0·0175	+ 0·0008
37	33 Persei α	1·9	91·00	81·97	2	19	28·097	28·156	3. 16. 28·150	+ 4·2545	+ 0·0483	+ 0·0015
	„ S.P.		88·35		1		28·202					
38	1 Tauri o	3·8	89·69	83·28	14	35	53·550	53·567	3. 18. 53·550	+ 3·2276	+ 0·0115	— 0·0052
39	5 Tauri f	4·3	88·89	82·77	16	41	47·942	47·928	3. 24. 47·942	+ 3·3046	+ 0·0130	— 0·0002
40	18 Eridani ε	3·7	90·23	82·50	8	35	44·809	44·826	3. 27. 44·818	+ 2·8901	+ 0·0055	— 0·0675
41	11 Tauri	6·7*	89·62	83·33	9	25	12·074	12·057	3. 34. 12·067	+ 3·5733	+ 0·0189	— 0·0002
42	23 Eridani δ	3·7	89·54	81·84	9	25	58·665	58·691	3. 37. 58·675	+ 2·8778	+ 0·0054	— 0·0081
43	25 Tauri η	3·0	88·56	81·88	16	32	56·704	56·695	3. 40. 56·704	+ 3·5560	+ 0·0177	— 0·0004
44	34 Eridani γ^1	3·1	89·82	82·53	21	24	53·773	53·802	3. 52. 53·773	+ 2·7929	+ 0·0047	+ 0·0029
45	37 Tauri A^1	4·5	89·67	81·94	27	23	11·483	11·485	3. 58. 11·483	+ 3·5330	+ 0·0153	+ 0·0053
46	Groombridge 750	6·7	90·24	85·04	34	6	13·562	13·184	4. 2. 13·363	+17·1263	+ 1·7996	+ 0·0022
	„ S.P.		90·35		47		13·233					
47	43 Tauri ω^1	5·8	89·38	83·65	15	22	45·395	45·415	4. 2. 45·395	+ 3·4811	+ 0·0138	+ 0·0061
48	38 Eridani o^1	4·1	89·34	82·00	17	12	29·709	29·683	4. 6. 29·709	+ 2·9255	+ 0·0058	— 0·0006
49	54 Tauri γ	3·9	89·54	82·11	27	20	31·927	31·952	4. 13. 31·927	+ 3·4009	+ 0·0115	+ 0·0073
50	74 Tauri ε	3·7	89·64	83·20	16	27	11·565	11·534	4. 22. 11·565	+ 3·4900	+ 0·0120	+ 0·0070
51	87 Tauri α	1·0	89·29	81·99	40	68	36·469	36·473	4. 29. 36·469	+ 3·4333	+ 0·0105	+ 0·0035
52	94 Tauri τ	4·4	90·04	82·48	17	29	38·520	38·530	4. 35. 38·520	+ 3·5954	+ 0·0121	— 0·0010
53	57 Eridani μ	4·3	89·50	82·40	10	16	0·096	0·086	4. 40. 0·096	+ 2·9966	+ 0·0055	— 0·0002
54	3 Aurigæ ι	2·7	89·81	81·86	22	16	49·767	49·751	4. 49. 49·767	+ 3·8999	+ 0·0144	+ 0·0006
55	2 Leporis ε	3·3	89·83	81·61	7	20	48·242	48·230	5. 0. 48·237	+ 2·5366	+ 0·0033	+ 0·0004
56	13 Aurigæ α	0·2	91·38	81·69	3	30	33·578	33·721	5. 8. 33·718	+ 4·4168	+ 0·0172	+ 0·0079
	„ S.P.		88·12		3		33·847					
57	19 Orionis β	1·0	89·47	82·35	21	65	15·057	15·054	5. 9. 15·057	+ 2·8815	+ 0·0039	— 0·0012
58	112 Tauri β	1·9	89·90	82·36	19	63	20·273	20·265	5. 19. 20·273	+ 3·7874	+ 0·0082	+ 0·0013
59	34 Orionis δ	Var.	90·07	82·09	5	33	23·109	23·140	5. 26. 23·128	+ 3·0637	+ 0·0038	— 0·0014
60	11 Leporis α	2·7	91·01	80·64	4	25	52·662	52·696	5. 27. 52·688	+ 2·6449	+ 0·0029	— 0·0011
61	46 Orionis ε	1·8	89·04	83·34	11	25	37·880	37·855	5. 30. 37·880	+ 3·0431	+ 0·0035	— 0·0018
62	Columbæ α	2·7	91·15	82·47	1	15	39·924	39·986	5. 35. 39·979	+ 2·1713	+ 0·0028	+ 0·0050
63	53 Orionis κ	2·2	88·79	81·94	9	24	32·348	32·331	5. 42. 32·342	+ 2·8445	+ 0·0027	— 0·0017
64	58 Orionis α	Var.	89·24	82·28	31	65	12·969	12·967	5. 49. 12·969	+ 3·2456	+ 0·0027	+ 0·0008
65	34 Aurigæ β	2·1	...	80·57	...	12	...	27·586	5. 51. 27·586	+ 4·4055	+ 0·0041	— 0·0065
66	1 Geminorum	4·3	90·23	82·87	9	27	25·980	25·964	5. 57. 25·973	+ 3·6473	+ 0·0021	— 0·0010

33. A close double observed as one mass. The magnitude given in the *Uranometria Nova Oxoniensis* is 4·2. The magnitudes of the components given in Struve's *Mensuræ Micrometricæ* are 6·0 and 5·7.

44. The designation in B. F. and the B. A. C. is γ Eridani.

45. The magnitude given in the *Uranometria Nova Oxoniensis* is 4·8.

49. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·6.

57. The magnitude given is taken from Struve's *Mensuræ Micrometricæ*.

Mean Date. 1880+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				"	"	° ′ "	"	"	"		
89·66	82·09	9	31	0·22	0·60	69. 6. 0·40	—14·611	+ 0·347	+ 0·006	48 Arietis............ε	33
89·80	82·67	10	21	32·28	32·15	86. 20. 32·28	—14·394	+ 0·323	+ 0·073	92 Ceti....................α	34
89·55	82·26	19	24	23·58	23·19	70. 41. 23·58	—13·846	+ 0·365	— 0·005	57 Arietis.................δ	35
90·79	82·33	12	26	59·53	60·41	69. 14. 59 53	—13·231	+ 0·383	+ 0·030	61 Arietis ....τ[1]	36
91·00	81·73	2	20	51·36	51·92	40. 31. 51·80	—13·125	+ 0·473	+ 0·033	33 Persei ....α	37
88·35		1		51·51						„ S.P.	
89·89	83·14	11	22	31·88	31·75	81. 21. 31·88	—12·965	+ 0·364	+ 0·068	1 Tauri ....o	38
88·90	83·32	21	21	27·02	27·16	77. 26. 27·02	—12·566	+ 0·380	— 0·011	5 Tauri ....f	39
90·79	83·35	7	20	51·35	52·33	99. 49. 51·76	—12·362	+ 0·337	— 0·011	18 Eridani ....ε	40
89·43	83·83	6	15	36·95	36·65	65. 1. 36·83	—11·915	+ 0·423	+ 0·011	11 Tauri......................	41
90·24	81·18	8	15	10·81	11·10	100. 8. 10·91	—11·646	+ 0·346	— 0·743	23 Eridani ....δ	42
87·90	81·29	14	33	8·23	8·46	66. 14. 8·23	—11·435	+ 0·430*	+ 0·040	25 Tauri ....η	43
89·23	82·64	14	13	18·92	19·51	103. 49. 18·92	—10·560	+ 0·350	+ 0·106	34 Eridani ....γ[1]	44
89·13	81·95	12	24	9·39	9·23	68. 13. 9·39	—10·163	+ 0·448	+ 0·058	37 Tauri..................A[1]	45
90·59	84·73	13	12	8·37	8·74	4. 44. 8·75	— 9·857	+ 2·179	— 0·015	Groombridge 750 ...	46
90·35		47		8·86						„ S.P.	
89·55	82·17	10	21	56·66	56·33	70. 40. 56·66	— 9·818	+ 0·446	+ 0·033	43 Tauri ....ω[1]	47
89·24	83·02	8	13	29·53	30·48	97. 7. 29·79	— 9·531	+ 0·379	— 0·085	38 Eridani ....o[1]	48
89·27	82·87	12	23	18·96	19·04	74. 38. 18·96	— 8·984	+ 0·447	+ 0·030	54 Tauri ....γ	49
89·32	80·66	12	13	50·71	51·76	71. 3. 50·71	— 8·300	+ 0·466	+ 0·028	74 Tauri ....ε	50
89·42	81·93	35	53	45·00	45·07	73. 42. 45·00	— 7·706	+ 0·465	+ 0·184	87 Tauri ....α	51
90·12	81·32	9	28	17·89	17·41	67. 15. 17·68	— 7·215	+ 0·492	+ 0·009	94 Tauri ....τ	52
89·87	81·84	10	11	24·82	25·13	93. 27. 24·82	— 6·859	+ 0·413	+ 0·002	57 Eridani ....μ	53
88·46	81·24	7	16	31·35	31·51	57. 0. 31·41	— 6·045	+ 0·544	+ 0·003	3 Aurigæ ....ι	54
89·56	80·76	4	25	10·04	10·28	112. 31. 10·22	— 5·122	+ 0·360	+ 0·068	2 Leporis ....ε	55
91·08	80·97	2	18	53·93	53·28	44. 6. 53·40	— 4·464	+ 0·629	+ 0·424	13 Aurigæ ....α	56
88·12		3		53·87						„ S.P...........	
89·26	82·48	11	36	44·98	45·68	98. 19. 44·98	— 4·405	+ 0·412	— 0·005	19 Orionis ....β	57
89·79	80·74	19	46	9·93	10·51	61. 29. 9·93	— 3·539	+ 0·545	+ 0·180	112 Tauri ....β	58
89·38	83·37	11	24	52·42	52·40	90. 22. 52·42	— 2·930	+ 0·443	+ 0·005	34 Orionis ....δ	59
91·22	79·92	3	25	6·08	6·47	107. 54. 6·39	— 2·802	+ 0·383	— 0·010	11 Leporis ....α	60
88·11	82·75	7	17	22·19	21·74	91. 16. 22·03	— 2·564	+ 0·441	— 0·006	46 Orionis .. ..ε	61
91·15	82·87	1	15	4·70	0·67	124. 8. 1·12	— 2·125	+ 0·316	+ 0·030	Columbæ ....α	62
87·87	82·34	7	16	33·48	33·92	99. 42. 33·64	— 1·527	+ 0·414	— 0·004	53 Orionis ....κ	63
89·22	82·61	26	43	50·79	51·13	82. 36. 50·79	— 0·944	+ 0·473	— 0·024	58 Orionis ....α	64
88·01	80·70	1	9	51·44	52·66	45. 3. 52·46	— 0·747	+ 0·642	+ 0·011	34 Aurigæ .... β	65
88·96	83·38	5	27	53·94	53·59	66. 43. 53·74	— 0·224	+ 0·532	+ 0·093	1 Geminorum...........	66

59. The magnitude given in H. P. is 2·4; in the *Uranometria Nova Oxoniensis* 2·0. The limits of magnitude are 2·2 and 2·7. Auwers found a 16[d.] period, Schönfeld a slight variation but no period, Chandler and Sawyer no fluctuation of light.
62. Authority for Proper Motion: Cape Catalogue 1880.
64. The magnitude given in H.P. is 0·9. The limits of magnitude are 1 and 1·4; Argelander found period 196[d.], Schönfeld thinks periodicity questionable.

No.	Star's Name.	Mag.	Mean Date, 1800+		No. of Observations.		Seconds of Mean R.A. 1890·0 deduced from		Adopted Mean R.A.	Annual Precession.	Secular Variation.	Annual Proper Motion.
			1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.
							s	s	h m s	s	s	s
67	67 Orionis ....ν	4·4	89·19	82·80	11	31	17·427	17·433	6. 1. 17·427	+ 3·4253	+ 0·0017	— 0·0003
68	7 Geminorum ....η	Var.	89·99	81·08	5	24	14·231	14·237	6. 8. 14·235	+ 3·6270	+ 0·0007	— 0·0050
69	1 Canis Majoris ......ζ	3·0	88·92	82·22	3	5	5·354	5·425	6. 16. 5·390	+ 2·3021	+ 0·0019	— 0·0001
70	13 Geminorum ....μ	3·2	89·38	81·98	28	36	18·298	18·300	6. 16. 18·298	+ 3·6268	— 0·0004	+ 0·0037
71	2 Canis Majoris ......β	2·0	89·63	82·11	12	20	51·290	51·287	6. 17. 51·290	+ 2·6420	+ 0·0016	— 0·0015
72	18 Geminorum ....ν	4·0	89·33	82·08	16	40	25·882	25·859	6. 22. 25·882	+ 3·5642	— 0·0009	— 0·0022
73	24 Geminorum ....γ	2·0	89·09	82·11	22	69	21·396	21·403	6. 31. 21·396	+ 3·4646	— 0·0015	+ 0·0023
74	31 Geminorum ....ξ	3·4	89·21	81·12	28	40	6·890	6·906	6. 39. 6·890	+ 3·3770	— 0·0018	— 0·0087
75	9 Canis Majoris ......α	—1·4	89·64	81·75	8	34	18·075	18·124	6. 40. 18·101	+ 2·6810	+ 0·0010	— 0·0372
76	Cephei 51 (Hev.) ...	5·3	89·84	82·30	25	192	46·624	46·054	6. 48. 46·230	+29·9647	— 2·4159	— 0·0403
	„ S.P.		89·10		46		46·016					
77	14 Canis Majoris ......θ	4·2	90·65	81·56	2	14	4·737	4·690	6. 49. 4·700	+ 2·7971	+ 0·0004	— 0·0105
78	21 Canis Majoris ......ε	1·5	91·32	81·97	4	20	18·081	18·126	6. 54. 18·113	+ 2·3574	+ 0·0013	— 0·0011
79	43 Geminorum ....ζ	Var.	89·32	82·43	16	29	35·037	35·041	6. 57. 35·037	+ 3·5626	— 0·0051	— 0·0011
80	23 Canis Majoris ......γ	4·1	88·70	81·62	7	10	46·844	46·865	6. 58. 46·850	+ 2·7146	+ 0·0005	— 0·0018
81	25 Canis Majoris ......δ	1·9	90·11	78·61	1	4	55·130	55·108	7. 3. 55·115	+ 2·4396	+ 0·0011	— 0·0015
82	51 Geminorum.......	5·4	88·53	81·83	10	31	3·249	3·254	7. 7. 3·249	+ 3·4478	— 0·0049	+ 0·0003
83	55 Geminorum ....δ	3·7	89·49	82·57	11	30	33·168	33·182	7. 13. 33·168	+ 3·5898	— 0·0073	— 0·0025
84	3 Canis Minoris ......β	3·1	89·28	82·04	9	35	11·074	11·094	7. 21. 11·084	+ 3·2601	— 0·0041	— 0·0042
85	66 Geminorum ....α[1]	1·6	89·32	80·82	8	22	34·504	34·488	7. 27. 34·497	+ 3·8515	— 0·0134	— 0·0151
86	66 Geminorum ....α[2]		89·02	81·64	32	74	34·851	34·868	7. 27. 34·851	+ 3·8515	— 0·0134	— 0·0151
87	10 Canis Minoris ......α	0·5	89·15	81 58	31	88	32·668	32·645	7. 33. 32·668	+ 3·1909	— 0·0041	— 0·0474
88	78 Geminorum ....β	1·1	89·48	81·68	26	84	35·073	35·056	7. 38. 35·073	+ 3·7265	— 0·0128	— 0·0481
89	Argûs....................ξ	3·4	88·51	81·26	8	13	40·011	40·085	7. 44. 40·031	+ 2·5236	+ 0·0009	— 0·0011
90	Groombridge 1119	7·1	90·30	83·42	49	6	51·175	50·076	7. 46. 51·511	+68·8244	—32·4007	...
	„ S.P.		90·48		104		51·670					
91	6 Cancri	5·0	89·66	82·21	20	36	45·697	45·679	7. 56. 45·697	+ 3·6957	— 0·0148	— 0·0025
92	15 Argûs....................ρ	2·9	89·25	82·12	7	20	51·519	51·516	8. 2. 51·518	+ 2·5611	+ 0·0009	— 0·0075
93	17 Cancri...................β	3·8	89·24	82·77	21	31	32·938	32·940	8. 10. 32·938	+ 3·2614	— 0·0071	— 0·0044
94	20 Cancri ....d[1]	5·9	88·83	82·48	9	22	3·859	3·891	8. 17. 3·872	+ 3·4462	— 0·0114	— 0·0053
95	33 Cancri...................η	5·5	89·44	81·77	15	15	20·833	20·815	8. 26. 20·833	+ 3·4806	— 0·0131	— 0·0039
96	43 Cancri...................γ	4·8	89·11	83·05	12	28	55·189	55·211	8. 36. 55·189	+ 3·4880	— 0·0143	— 0·0087
97	11 Hydræ ....ε	3·6	88·82	82·73	11	15	56·970	57·028	8. 40. 56·970	+ 3·1946	— 0·0071	— 0·0135
98	9 Ursæ Majoris.........ι	3·2	88·19	79·64	3	6	40·489	40·439	8. 51. 40·469	+ 4·1780	— 0·0446	— 0·0441
	„ S.P. ...		87·64		1		40·504					
99	65 Cancri...................α	4·3	88·80	82·24	14	18	28·257	28·279	8. 52. 28·257	+ 3·2849	— 0·0098	+ 0·0010

68. The limits of magnitude are 3·2 and 3·7—4·2: the period 229ᵈ·1. 72. The magnitude given in the *Uranometria Nova Oxoniensis* is 4·3.

75. The magnitude given in the *Uranometria Nova Oxoniensis* is + 2·0 in the notation of that work, which corresponds to — 1·0, *i.e.*, 2 magnitudes brighter than a standard first magnitude star. The corrections applied to the R. A. and N. P. D. of α Canis Majoris for the effect of orbital motion to reduce the observations of 1887–1891 to the epoch 1890 are + 0ˢ·007 and — 0″·009 respectively, and from 1880, the epoch of the Ten-Year Catalogue, to 1890 are + 0ˢ·166 and — 0″·83 respectively. These corrections are derived from Auwers' Elements (*Astronomische Nachrichten*, Vol. 129).

79. The limits of magnitude are 3·7 and 4·5: the period 10ᵈ. 3ʰ. 41ᵐ·5.

Mean Date. 1800+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				"	"	° ' "	"	"	"		
89·40	82·82	8	21	9·44	8·67	75. 13. 9·14	+ 0·113	+ 0·500	+ 0·013	67 Orionis ....ν	67
89·14	81·22	4	17	43·69	43·86	67. 27. 43·81	+ 0·721	+ 0·528	+ 0·003	7 Geminorum ....η	68
89·11	82·22	3	5	53·93	54·26	120. 0. 54·10	+ 1·406	+ 0·334	— 0·012	1 Canis Majoris ......ζ	69
89·85	82·15	16	24	50·43	50·61	67. 25. 50·43	+ 1·426	+ 0·527	+ 0·101	13 Geminorum ....μ	70
89·80	82·76	6	11	7·32	7·02	107. 54. 7·22	+ 1·561	+ 0·384	— 0·003	2 Canis Majoris ....β	71
89·83	82·50	14	31	7·98	8·29	69. 43. 7·98	+ 1·960	+ 0·517	+ 0·006	18 Geminorum ....ν	72
88·68	82·64	25	54	26·98	27·37	73. 30. 26·98	+ 2·736	+ 0·500	+ 0·035	24 Geminorum ....γ	73
89·48	80·46	22	21	11·43	11·74	76. 59. 11·43	+ 3·405	+ 0·484	+ 0·195	31 Geminorum ....ξ	74
89·39	81·91	7	43	59·22	58·42	106. 33. 58·73	+ 3·509	+ 0·384	+ 1·199	9 Canis Minoris ......α	75
89·38	82·25	88	595	54·40	54·96	2. 46. 54·72	+ 4·237	+ 4·270	+ 0·051	Cephei 51 (Hev.)......	76
89·49		177		54·88						" S.P.	
90·65	81·70	2	10	5·58	4·93	101. 54. 5·12	+ 4·262	+ 0·397	+ 0·003	14 Canis Majoris ......θ	77
91·05	82·17	2	17	21·96	22·55	118. 49. 22·44	+ 4·708	+ 0·332	— 0·017	21 Canis Majoris ....ε	78
88·71	81·68	14	39	8·48	8·62	69. 16. 8·48	+ 4·985	+ 0·502	— 0·001	43 Geminorum ....ζ	79
88·30	82·43	6	13	16·54	16·76	105. 28. 16·61	+ 5·087	+ 0·381	+ 0·003	23 Canis Majoris.........γ	80
90·11	78·61	1	4	10·45	8·71	116. 13. 9·29	+ 5·521	+ 0·340	— 0·007	25 Canis Majoris.........δ	81
90·10	81·47	3	24	18·40	18·33	73. 39. 18·34	+ 5·784	+ 0·479	+ 0·033	51 Geminorum...........	82
89·28	81·53	10	45	57·21	57·01	67. 48. 57·21	+ 6·326	+ 0·495	— 0·003	55 Geminorum ....δ	83
89·08	83·33	14	25	23·01	22·90	81. 29. 23·01	+ 6·956	+ 0·444	+ 0·030	3 Canis Minoris ......β	84
88·60	80·66	12	27	19·13	18·50	57. 52. 19·13	+ 7·478	+ 0·519	+ 0·079	66 Geminorum ....α[1]	85
89·12	80·97	24	67	15·36	15·33	57. 52. 15·36	+ 7·478	+ 0·519	+ 0·079	66 Geminorum ....α[2]	86
89·05	81·29	22	71	36·22	36·35	84. 29. 36·22	+ 7·960	+ 0·424	+ 1·027	10 Canis Minoris ......α	87
89·45	80·88	18	78	31·91	31·56	61. 42. 31·91	+ 8·363	+ 0·491	+ 0·051	78 Geminorum...........β	88
88·47	80·52	3	13	3·81	3·38	114. 35. 3·51	+ 8·844	+ 0·327	— 0·024	Argûs ....ξ	89
90·13	82·56	36	13	25·81	26·30	1. 2. 26·15	+ 9·013	+ 8·961	...	Groombridge 1119 ...	90
90·56		79		26·31						" S.P.	
89·68	83·78	14	24	51·90	52·39	61. 53. 51·90	+ 9·781	+ 0·467	+ 0·039	6 Cancri	91
89·56	82·16	7	15	16·06	15·72	113. 59. 15·94	+10·243	+ 0·317	— 0·061	15 Argûs ....ρ	92
89·48	83·56	15	18	33·93	33·84	80. 28. 33·93	+10·815	+ 0·397	+ 0·041	17 Cancri ....β	93
88·63	81·64	15	13	54·70	55·13	71. 18. 54·70	+11·290	+ 0·411	+ 0·022	20 Cancri ....d[1]	94
89·13	82·02	13	11	8·77	8·68	69. 11. 8·77	+11·952	+ 0·403	+ 0·047	33 Cancri..................η	95
90·01	82·36	17	40	11·65	11·29	68. 8. 11·65	+12·682	+ 0·390	+ 0·033	43 Cancri ....γ	96
89·64	82·93	2	16	41·16	41·16	83. 10. 41·16	+12·954	+ 0·351	+ 0·023	11 Hydræ..................ε	97
88·19	79·64	3	6	37·22	37·07	41. 31. 37·15	+13·656	+ 0·442	+ 0·247	9 Ursæ Majoris.........ι	98
87·64		1		38·99						" S.P. ...	
88·84	81·36	10	28	1·36	1·09	77. 43. 1·36	+13·707	+ 0·345	+ 0·022	65 Cancri..................α	99

85, 86. The magnitudes given in B. D. are 8·6 and 1·7.

87. The corrections applied to the R. A. and N. P. D. of α Canis Minoris for the effect of orbital motion to reduce the observations of 1887—1891 to the epoch 1890 are + 0s·009 and + 0"·07 respectively, and from 1880 the epoch of the Ten-Year Catalogue to 1890 are + 0s·099 and + 0"·06 respectively. The corrections are derived from Auwers' Elements (*Astronomische Nachrichten*, Vol. 129).

89. This star is designated ξ Navis in B. F.

92. This star is designated ι Navis in B. F., and 15 Argûs in the *Nautical Almanac*.

No.	Star's Name.	Mag.	Mean Date. 1800+		No. of Observations.		Seconds of Mean R.A. 1890·0 deduced from		Adopted Mean R.A.	Annual Precession.	Secular Variation.	Annual Proper Motion.
			1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.
							s	s	h m s	s	s	s
100	76 Cancri .... κ	5·0	88·79	81·68	16	20	47·349	47·317	9. 1. 47·349	+ 3·2567	— 0·0094	— 0·0028
101	83 Cancri	6·6	88·97	82·29	17	27	50·473	50·505	9. 12. 50·473	+ 3·3649	— 0·0134	— 0·0090
102	Piazzi IX. 37	4·6	89·92	84·19	19	10	21·791	21·626	9. 21. 21·741	+ 9·0019	— 0·7840	— 0·0173
	„ S.P. ...		90·88		15		21·678					
103	30 Hydræ .... α	2·0	89·69	82·66	14	29	10·878	10·883	9. 22. 10·878	+ 2·9504	— 0·0014	— 0·0019
104	5 Leonis .... ξ	5·2	89·33	81·57	11	18	0·953	0·978	9. 26. 0·953	+ 3·2461	— 0·0100	— 0·0076
105	14 Leonis .... ο	3·8	89·29	82·16	11	28	16·745	16·762	9. 35. 16·745	+ 3·2172	— 0·0092	— 0·0104
106	17 Leonis .... ε	3·1	89·14	81·66	15	31	36·408	36·427	9. 39. 36·408	+ 3·4192	— 0·0179	— 0·0043
107	24 Leonis .... μ	4·1	89·31	82·44	12	24	30·420	30·390	9. 46. 30·420	+ 3·4395	— 0·0197	— 0·0185
108	29 Leonis .... π	5·0	89·44	82·72	8	28	23·994	24·006	9. 54. 24·000	+ 3·1775	— 0·0081	— 0·0040
109	32 Leonis .... α	1·4	89·45	81·16	38	66	30·804	30·800	10. 2. 30·804	+ 3·2179	— 0·0101	— 0·0182
110	41 Leonis .... γ¹	2·2	89·74	82·35	28	55	54·451	54·445	10. 13. 54·451	+ 3·2945	— 0·0148	+ 0·0208
111	41 Leonis .... γ²		90·29	80·71	6	8	54·683	54·694	10. 13. 54·686	+ 3·2945	— 0·0148	+ 0·0208
112	42 Hydræ .... μ	4·1	89·31	83·02	3	22	46·152	46·184	10. 20. 46·177	+ 2·9088	+ 0·0040	— 0·0098
113	47 Leonis .... ρ	4·0	89·27	82·20	9	33	1·135	1·110	10. 27. 1·124	+ 3·1643	— 0·0080	— 0·0012
114	34 Sextantis	7·7*	89·42	82·21	11	22	56·661	56·631	10. 36. 56·661	+ 3·1069	— 0·0046	— 0·0090
115	53 Leonis l	5·3	89·57	81·77	9	29	28·504	28·483	10. 43. 28·495	+ 3·1589	— 0·0081	— 0·0015
116	58 Leonis .... d	5·0	89·12	83·22	12	25	52·756	52·744	10. 54. 52·756	+ 3·1000	— 0·0038	— 0·0018
117	50 Ursæ Majoris .... α	2·0	89·61	82·49	3	51	56·212	56·113	10. 56. 56·143	+ 3·7655	— 0·0819	— 0·0180
	„ S.P. ...		89·80		2		56·233					
118	63 Leonis .... χ	4·7	89·32	82·98	13	26	20·540	20·570	10. 59. 20·540	+ 3·1212	— 0·0056	— 0·0255
119	68 Leonis .... δ	2·8	89·28	81·73	16	43	15·482	15·486	11. 8. 15·482	+ 3·1882	— 0·0132	+ 0·0102
120	12 Crateris .... δ	3·9	89·00	81·86	9	26	50·415	50·428	11. 13. 50·421	+ 3·0049	+ 0·0064	— 0·0106
121	84 Leonis .... τ	5·0	89·14	82·47	12	33	16·793	16·797	11. 22. 16·793	+ 3·0857	— 0·0021	— 0·0010
122	1 Draconis .... λ	4·1	88·37	82·25	1	32	52·078	52·090	11. 24. 52·107	+ 3·6313	— 0·1115	— 0·0085
	„ S.P.		89·80		3		52·208					
123	91 Leonis .... υ	4·5	89·01	82·39	7	33	18·928	18·959	11. 31. 18·945	+ 3·0718	+ 0·0003	— 0·0018
124	94 Leonis .... β	2·2	89·33	82·36	22	72	26·903	26·907	11. 43. 26·905	+ 3·0987	— 0·0073	— 0·0356
125	5 Virginis .... β	3·7	90·02	83·04	7	26	57·868	57·911	11. 44. 57·890	+ 3·0762	— 0·0003	+ 0·0481
126	64 Ursæ Majoris .... γ	2·6	90·31	82·31	5	34	2·568	2·590	11. 48. 2·586	+ 3·1695	— 0·0432	+ 0·0098
	„ S.P. ...		91·30		2		2·611					
127	8 Virginis .... π	4·4	89·50	82·46	15	27	14·145	14·121	11. 55. 14·145	+ 3·0760	— 0·0022	— 0·0028
128	9 Virginis .... ο	4·3	89·15	82·61	8	25	36·322	36·318	11. 59. 36·320	+ 3·0729	— 0·0031	— 0·0159
129	2 Corvi .... ε	3·1	89·35	82·73	4	29	27·999	28·009	12. 4. 28·007	+ 3·0830	+ 0·0142	— 0·0059
130	15 Virginis .... η	4·1	89·41	83·00	9	31	16·631	16·635	12. 14. 16·633	+ 3·0726	+ 0·0027	— 0·0056
131	Bradley 1672	6·3	90·07	79·75	48	2	22·157	21·812	12. 14. 21·446	+ 0·2341	+ 0·8601	— 0·0831
	„ S.P. ...		89·96		54		20·815					

110, 111. The magnitudes given in Struve's *Mensuræ Micrometricæ* are 2·0 and 3·5.

Mean Date. 1800+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				″	″	° ′ ″	″	″	″		
89·55	83·04	17	37	22·68	22·65	78. 53. 22·68	+14·290	+ 0·328	− 0·009	76 Cancri..................κ	100
89·32	82·16	12	31	43·62	43·29	71. 49. 43·62	+14·952	+ 0·322	+ 0·139	83 Cancri	101
89·97	84·78	23	13	17·96	17·96	8. 11. 17·87	+15·439	+ 0·831	+ 0·020	Piazzi IX. 37	102
90·90		22		17·78						„ S.P. ...	
89·75	82·23	11	30	55·73	56·01	98. 10. 55·73	+15·484	+ 0·268	− 0·052	30 Hydræ ....α	103
88·84	82·86	8	15	48·80	48·27	78. 12. 48·62	+15·695	+ 0·289	+ 0·060	5 Leonis..................ξ	104
89·17	82·72	14	28	27·50	27·63	79. 36. 27·50	+16·187	+ 0·271	+ 0·018	14 Leonis..................ο	105
89·03	81·51	8	27	10·67	10·71	65. 43. 10·69	+16·407	+ 0·281	+ 0·008	17 Leonis..................ε	106
88·92	82·29	29	39	31·13	31·25	63. 28. 31·13	+16·747	+ 0·270	+ 0·045	24 Leonis..................μ	107
88·95	82·46	14	21	42·07	42·49	81. 25. 42·07	+17·117	+ 0·235	+ 0·011	29 Leonis ....π	108
89·36	80·88	29	81	43·56	44·09	77. 29. 43·56	+17·476	+ 0·224	− 0·018	32 Leonis..................α	109
89·87	83·01	15	50	8·61	8·80	69. 36. 8·61	+17·943	+ 0·208	+ 0·136	41 Leonis ....γ^1	110
90·26	81·63	5	11	10·80	10·24	69. 36. 10·59	+17·941	+ 0·208	+ 0·136	41 Leonis ....γ^2	111
90·27	83·02	8	21	30·62	30·29	106. 16. 30·49	+18·203	+ 0·171	+ 0·061	42 Hydræ ....μ	112
89·29	81·99	9	29	39·45	39·41	80. 7. 39·43	+18·426	+ 0·175	− 0·011	47 Leonis..............ρ	113
89·35	83·21	10	29	32·27	32·49	85. 50. 32·27	+18·751	+ 0·154	− 0·033	34 Sextantis	114
88·93	83·83	14	41	23·25	22·58	78. 52. 23·25	+18·946	+ 0·144	+ 0·020	53 Leonis..................l	115
88·98	82·83	7	36	31·68	31·57	85. 47. 31·61	+19·250	+ 0·119	+ 0·012	58 Leonis ....d	116
89·40	82·15	8	101	19·64	19·40	27. 39. 19·67	+19·299	+ 0·143	+ 0·071	50 Ursæ Majoris ......α	117
89·80		2		20·16						„ S.P....	
89·87	83·79	14	23	10·16	10·32	82. 4. 10·16	+19·355	+ 0·112	+ 0·022	63 Leonis..................χ	118
89·28	81·74	21	64	25·38	25·44	68. 52. 25·38	+19·545	+ 0·097	+ 0·115	68 Leonis..................δ	119
89·57	82·94	9	21	0·14	0·44	104. 11. 0·25	+19·648	+ 0·080	− 0·209	12 Crateris ....δ	120
89·76	82·33	20	44	17·14	17·15	86. 32. 17·14	+19·783	+ 0·066	+ 0·006	84 Leonis..................τ	121
89·32	82·00	8	60	43·30	42·95	20. 3. 43·12	+19·818	+ 0·074	+ 0·027	1 Draconis..............λ	122
89·80		9		42·63						„ S.P.	
89·13	81·71	12	47	59·40	59·52	90. 12. 59·40	+19·897	+ 0·048	− 0·047	91 Leonis..................υ	123
89·21	82·24	24	52	47·29	47·40	74. 48. 47·29	+20·002	+ 0·025	+ 0·098	94 Leonis ....β	124
90·31	83·64	10	32	55·69	55·63	87. 36. 55·69	+20·010	+ 0·022	+ 0·262	5 Virginis..............β	125
90·31	82·19	5	35	37·28	37·10	35. 41. 37·18	+20·027	+ 0·017	− 0·008	64 Ursæ Majoris ......γ	126
91·30		2		37·28						„ S.P....	
89·62	82·92	30	22	20·61	20·30	82. 46. 20·61	+20·049	+ 0·002	+ 0·017	8 Virginis..............π	127
88·44	83·11	18	22	22·41	21·97	80. 39. 22·41	+20·053	− 0·007	− 0·049	9 Virginis ....ο	128
89·65	82·88	6	20	29·49	29·08	112. 0. 29·30	+20·049	− 0·016	− 0·021	2 Corvi ....ε	129
89·37	83·53	10	33	19·63	19·54	90. 3. 19·63	+20·014	− 0·036	+ 0·022	15 Virginis..............η	130
90·09	79·75	41	2	24·97	24·76	1. 41. 25·22	+20·015	− 0·011	− 0·076	Bradley 1672	131
89·89		44		25·45						„ S.P. ...	

122. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·8.
126. The magnitude given in the *Uranometria Nova Oxoniensis* is 2·3.

No.	Star's Name.	Mag.	Mean Date. 1800+		No. of Observations.		Seconds of Mean R.A. 1890·0 deduced from		Adopted Mean R.A.	Annual Precession.	Secular Variation.	Annual Proper Motion.
			1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.
							s	s	h m s	s	s	s
132	7 Corvi .... δ^2	3·1	89·28	82·03	18	20	10·322	10·332	12. 24. 10·322	+ 3·1126	+ 0·0119	− 0·0142
133	9 Corvi .... β	2·8	88·91	82·79	8	18	36·519	36·514	12. 28. 36·517	+ 3·1424	+ 0·0164	− 0·0033
134	29 Virginis .... γ^1	2·8	88·23	81·37	5	16	5·013	5·047	12. 36. 5·028	+ 3·0756	+ 0·0043	− 0·0385
135	29 Virginis .... γ^2		89·30	81·22	2	9	5·157	5·221	12. 36. 5·203	+ 3·0756	+ 0·0043	− 0·0385
136	30 Virginis .... ρ	5·1	89·35	82·57	17	19	18·985	18·983	12. 36. 18·985	+ 3·0320	− 0·0016	+ 0·0033
137	35 Virginis	6·7*	88·48	81·72	11	27	15·324	15·314	12. 42. 15·324	+ 3·0546	+ 0·0021	− 0·0030
138	31 Comæ	5·0	89·55	81·81	7	33	20·408	20·420	12. 46. 20·415	+ 2·9289	− 0·0097	− 0·0027
139	43 Virginis .... δ	3·7	89·18	82·52	16	36	3·728	3·709	12. 50. 3·728	+ 3·0523	+ 0·0026	− 0·0336
140	12 Canum Venaticûm .. α	3·2	89·31	78·93	4	22	52·895	52·907	12. 50. 52·904	+ 2·8348	− 0·0152	− 0·0220
141	47 Virginis .... ϵ	3·0	88·32	81·96	17	69	42·056	42·038	12. 56. 42·056	+ 3·0055	− 0·0007	− 0·0192
142	51 Virginis .... θ	4·4	89·25	82·63	21	49	15·216	15·246	13. 4. 15·216	+ 3·1046	+ 0·0078	− 0·0043
143	67 Virginis .... α	1·2	89·88	81·51	39	162	23·845	23·820	13. 19. 23·845	+ 3·1574	+ 0·0115	− 0·0044
144	79 Virginis .... ζ	3·5	89·54	82·60	40	77	5·233	5·238	13. 29. 5·233	+ 3·0727	+ 0·0064	− 0·0205
145	82 Virginis .... m	5·3	89·29	82·87	21	32	50·250	50·255	13. 35. 50·250	+ 3·1502	+ 0·0107	− 0·0085
146	4 Boötis .... τ	4·5	89·64	81·52	18	26	2·057	2·071	13. 42. 2·057	+ 2·8853	− 0·0007	− 0·0346
147	85 Ursæ Majoris .... η	2·0	90·08	82·09	3	39	12·347	12·368	13. 43. 12·361	+ 2·3824	− 0·0104	− 0·0115
148	8 Boötis .... η	2·9	89·34	81·11	16	50	26·804	26·797	13. 49. 26·804	+ 2·8615	− 0·0006	− 0·0049
149	93 Virginis .... τ	4·4	90·14	82·32	10	24	2·851	2·845	13. 56. 2·851	+ 3·0490	+ 0·0065	− 0·0005
150	94 Virginis	6·8	89·48	80·68	6	13	28·225	28·244	14. 0. 28·231	+ 3·1712	+ 0·0115	− 0·0032
151	11 Draconis .... α	3·6	88·01	83·27	5	34	24·658	24·648	14. 1. 24·673	+ 1·6303	+ 0·0048	− 0·0092
	„ S.P.		90·69		3		24·776					
152	98 Virginis .... κ	4·3	88·35	83·12	7	19	1·606	1·631	14. 7. 1·617	+ 3·1935	+ 0·0123	− 0·0004
153	16 Boötis .... α	0·0	89·53	82·30	50	141	38·629	38·618	14. 10. 38·629	+ 2·8132	+ 0·0004	− 0·0799
154	22 Boötis .... f	5·4	88·68	82·41	6	26	20·338	20·354	14. 21. 20·347	+ 2·7953	+ 0·0009	− 0·0057
155	25 Boötis .... ρ	3·6	88·81	82·94	7	29	5·329	5·338	14. 27. 5·334	+ 2·5944	− 0·0016	− 0·0085
156	36 Boötis .... ϵ^2	3·0	89·59	82·20	21	55	10·955	10·954	14. 40. 10·955	+ 2·6239	0·0000	− 0·0043
157	9 Libræ .... α	3·0	89·27	81·31	5	25	47·561	47·550	14. 44. 47·556	+ 3·3181	+ 0·0155	− 0·0093
158	15 Libræ .... ξ^2	5·8	89·22	81·59	7	14	47·939	47·916	14. 50. 47·931	+ 3·2481	+ 0·0130	− 0·0019
159	7 Ursæ Minoris ...... β	2·1	89·21	81·56	3	54	1·582	1·812	14. 51. 1·789	− 0·2237	+ 0·1018	− 0·0077
	„ S.P. ...		...		...		...					
160	42 Boötis .... β	3·6	90·43	80·07	3	7	48·133	48·141	14. 57. 48·137	+ 2·2636	0·0000	− 0·0048
161	43 Boötis .... ψ	4·5	89·30	81·84	12	20	43·937	43·884	14. 59. 43·937	+ 2·5835	+ 0·0011	− 0·0145
162	24 Libræ .... ι^1	4·9	89·71	83·42	6	25	57·008	57·034	15. 5. 57·021	+ 3·4134	+ 0·0171	− 0·0037
163	27 Libræ .... β	2·7	89·51	82·16	8	25	5·183	5·214	15. 11. 5·196	+ 3·2289	+ 0·0118	− 0·0079
164	Groombridge 2283 ...	7·1	90·24	86·81	53	3	50·203	49·534	15. 12. 49·923	−21·2694	+ 7·3060	...
	„ S.P. ...		90·47		30		49·427					

134, 135. The magnitude of each star in Struve's *Mensuræ Micrometricæ* is 3·0.
139. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·5.
140. The magnitude given is taken from Struve's *Mensuræ Micrometricæ*.

Mean Date 1800+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				″	″	° ′ ″	″	″	″		
90·06	82·30	19	27	11·14	11·01	105. 54. 11·14	+19·942	−0·055	+0·146	7 Corvi .... δ^2	132
88·69	81·23	8	15	18·20	18·81	112. 47. 18·40	+19·897	−0·065	+0·052	9 Corvi .... β	133
89·12	83·20	7	32	43·60	43·15	90. 50. 43·36	+19·805	−0·078	−0·015	29 Virginis .... γ^1	134
89·33	81·79	4	14	48·91	48·52	90. 50. 48·66	+19·805	−0·078	−0·015	29 Virginis .... γ^2	135
89·54	81·35	14	13	29·21	29·35	79. 9. 29·21	+19·802	−0·077	+0·088	30 Virginis .... ρ	136
89·09	82·29	9	18	35·42	35·39	85. 49. 35·41	+19·713	−0·089	+0·006	35 Virginis	137
89·06	81·40	8	22	38·27	38·25	61. 51. 38·26	+19·645	−0·093	+0·018	31 Comæ	138
89·68	82·07	21	19	16·83	17·01	86. 0. 16·83	+19·577	−0·104	+0·047	43 Virginis .... δ	139
88·64	79·07	6	40	14·91	15·04	51. 5. 14·99	+19·561	−0·099	−0·066	12 Canum Venaticûm α	140
88·23	82·40	9	52	58·24	58·50	78. 26. 58·39	+19·442	−0·115	−0·029	47 Virginis .... ϵ	141
89·32	83·43	25	25	5·92	6·22	94. 57. 5·92	+19·271	−0·133	+0·037	51 Virginis .... θ	142
90·05	80·56	19	86	13·42	13·42	100. 35. 13·42	+18·863	−0·163	+0·018	67 Virginis .... α	143
89·85	82·52	30	36	59·87	59·63	90. 1. 59·87	+18·557	−0·177	−0·056	79 Virginis .... ζ	144
90·18	83·77	15	29	52·00	51·74	98. 8. 52·00	+18·326	−0·193	−0·046	82 Virginis .... m	145
88·90	82·45	17	21	41·49	41·47	71. 59. 41·49	+18·098	−0·188	−0·040	4 Boötis .... τ	146
89·44	82·08	2	42	15·61	15·30	40. 8. 15·33	+18·054	−0·159	+0·014	85 Ursæ Majoris ...... η	147
89·32	81·92	33	59	2·71	2·28	71. 3. 2·71	+17·810	−0·199	+0·344	8 Boötis .... η	148
89·67	83·82	18	33	22·29	22·39	87. 55. 22·29	+17·538	−0·222	+0·033	93 Virginis .... τ	149
89·55	80·69	7	17	59·60	59·19	98. 21. 59·45	+17·346	−0·239	−0·012	94 Virginis	150
87·78	82·89	14	77	53·86	53·82	25. 5. 53·85	+17·305	−0·127	−0·016	11 Draconis .... α	151
89·27		9		53·83						„ S.P.	
89·43	83·64	26	34	41·32	41·14	99. 45. 41·32	+17·051	−0·252	−0·141	98 Virginis .... κ	152
89·12	81·66	62	184	40·83	40·80	70. 14. 40·83	+16·882	−0·228	+1·977	16 Boötis .... α	153
88·23	82·09	21	28	41·82	41·94	70. 16. 41·82	+16·360	−0·242	−0·029	22 Boötis .... f	154
90·14	81·72	9	27	43·82	43·67	59. 8. 43·75	+16·064	−0·233	−0·125	25 Boötis .... ρ	155
89·22	82·22	19	71	42·30	42·40	62. 27. 42·30	+15·352	−0·252	−0·001	36 Boötis .... ϵ^2	156
88·73	82·79	15	47	3·88	3·79	105. 35. 3·88	+15·089	−0·324	+0·072	9 Libræ .... α	157
88·67	82·02	11	12	55·32	55·21	100. 57. 55·32	+14·738	−0·327	−0·006	15 Libræ .... ξ^2	158
89·40	81·70	17	98	41·61	41·66	15. 23. 41·68	+14·724	+0·017	+0·005	7 Ursæ Minoris ...... β	159
88·93		4		42·14						„ S.P. ...	
90·19	80·36	4	9	31·81	30·50	49. 10. 31·08	+14·314	−0·237	+0·036	42 Boötis .... β	160
89·21	82·22	14	21	23·48	23·65	62. 37. 23·48	+14·197	−0·272	+0·008	43 Boötis .... ψ	161
90·44	82·95	14	27	30·26	29·97	109. 22. 30·26	+13·807	−0·366	+0·042	24 Libræ .... ι^1	162
87·93	82·86	6	22	36·29	36·10	98. 58. 36·20	+13·478	−0·354	+0·017	27 Libræ .... β	163
90·17	86·23	43	5	41·43	41·65	2. 20. 41·47	+13·365	+2·318	...	Groombridge 2283 ...	164
90·45		22		41·54						„ S.P. ...	

143. The magnitude given in the *Uranometria Nova Oxoniensis* is 1·0.
153. The magnitude given in the *Uranometria Nova Oxoniensis* is 0·3.
156. The magnitude given is taken from Struve's *Mensuræ Micrometricæ*.

No.	Star's Name.	Mag.	Mean Date. 1800+ 1887 to 1891.	Mean Date. 1800+ 10-Year Catalogue.	No. of Observations. 1887 to 1891.	No. of Observations. 10-Year Catalogue.	Seconds of Mean R.A. 1890·0 deduced from 1887 to 1891.	Seconds of Mean R.A. 1890·0 deduced from 10-Year Catalogue.	Adopted Mean R.A. 1890·0.	Annual Precession. 1890·0.	Secular Variation. 1890·0.	Annual Proper Motion. 1890·0.
							s	s	h m s	s	s	s
165	30 Libræ ....o^2	6·3*	90·19	83·04	5	14	53·603	53·618	15. 16. 53·610	+ 3·3388	+ 0·0142	— 0·0025
166	32 Libræ.....................ζ^1	6·2	89·04	82·71	10	17	3·134	3·137	15. 22. 3·134	+ 3·3748	+ 0·0148	— 0·0010
167	5 Coronæ ....α	2·4	89·73	82·19	41	59	1·797	1·799	15. 30. 1·797	+ 2·5300	+ 0·0024	+ 0·0085
168	24 Serpentis ....α	2·7	89·66	82·75	16	34	50·965	50·929	15. 38. 50·965	+ 2·9429	+ 0·0062	+ 0·0079
169	37 Serpentis ....ε	3·7	89·31	82·94	15	31	19·929	19·906	15. 45. 19·929	+ 2·9789	+ 0·0066	+ 0·0068
170	16 Ursæ Minoris ....ζ „ S.P. ...	4·5	89·22 88·78	82·82	4 4	16	59·665 59·942	59·633	15. 47. 59·747	— 2·2627	+ 0·2027	+ 0·003
171	41 Serpentis ....γ	4·0	89·13	82·00	15	31	22·321	22·288	15. 51. 22·321	+ 2·7474	+ 0·0043	+ 0·0194
172	8 Scorpii ....β^1	2·0	89·95	83·37	12	25	2·346	2·412	15. 59. 2·346	+ 3·4816	+ 0·0142	— 0·0026
173	1 Ophiuchi ....δ	2·8	89·08	82·10	19	25	34·789	34·798	16. 8. 34·789	+ 3·1429	+ 0·0081	— 0·0049
174	20 Herculis ....γ	3·8	89·10	82·41	18	39	4·007	4·020	16. 17. 4·007	+ 2·6481	+ 0·0039	— 0·0049
175	14 Draconis..................η „ S.P.	2·8	90·31 ...	82·31	1 ...	30	29·920 ...	30·080	16. 22. 30·070	+ 0·8050	+ 0·0187	+ 0·006
176	21 Scorpii ....α	1·1	89·69	81·84	11	28	39·722	39·707	16. 22. 39·722	+ 3·6715	+ 0·0150	— 0·0022
177	10 Ophiuchi..................λ	4·0	89·36	83·38	9	17	21·868	21·890	16. 25. 21·875	+ 3·0249	+ 0·0063	— 0·0027
178	13 Ophiuchi ....ζ	2·8	89·43	81·97	12	30	6·053	6·046	16. 31. 6·053	+ 3·2984	+ 0·0087	— 0·0007
179	40 Herculis ....ζ	3·1	89·35	80·87	17	48	8·325	8·349	16. 37. 8·325	+ 2·2971	+ 0·0033	— 0·0356
180	27 Ophiuchi ....κ	3·4	88·54	82·26	11	47	27·654	27·641	16. 52. 27·654	+ 2·8573	+ 0·0044	— 0·0212
181	58 Herculis ....ε	4·0	89·31	82·33	8	32	4·797	4·829	16. 56. 4·813	+ 2·2975	+ 0·0032	— 0·0047
182	22 Ursæ Minoris ....ε „ S.P. ...	4·5	87·94 91·03	83·46	3 2	13	14·900 15·639	15·207	16. 57. 15·200	— 6·3448	+ 0·3092	+ 0·0090
183	35 Ophiuchi ....η	2·6	89·22	82·54	16	25	4·097	4·125	17. 4. 4·097	+ 3·4344	+ 0·0073	+ 0·0003
184	64 Herculis ....α^1	Var.	89·42	82·48	20	36	37·864	37·859	17. 9. 37·864	+ 2·7347	+ 0·0035	— 0·0019
185	42 Ophiuchi ....θ	3·4	89·16	80·73	8	22	15·142	15·213	17. 15. 15·172	+ 3·6809	+ 0·0080	— 0·0024
186	49 Ophiuchi ....σ	4·4	89·60	82·60	18	32	3·364	3·361	17. 21. 3·364	+ 2·9749	+ 0·0038	— 0·0017
187	23 Draconis ....β „ S.P.	3·0	88·53 87·96	82·73	8 1	26	56·806 56·708	56·787	17. 27. 56·792	+ 1·3545	+ 0·0051	— 0·0020
188	55 Ophiuchi ....α	2·2	89·37	82·96	32	77	49·662	49·661	17. 29. 49·662	+ 2·7753	+ 0·0029	+ 0·0066
189	60 Ophiuchi ....β	2·9	89·64	82·88	19	59	2·268	2·270	17. 38. 2·268	+ 2·9651	+ 0·0030	— 0·0041
190	86 Herculis...................μ	3·5	89·61	82·88	15	61	9·165	9·156	17. 42. 9·165	+ 2·3702	+ 0·0025	— 0·0244
191	89 Herculis	5·6	88·93	82·07	9	19	58·889	58·931	17. 50. 58·904	+ 2·4190	+ 0·0024	+ 0·0003
192	33 Draconis...................γ	2·4	90·69	81·99	12	48	3·039	3·090	17. 54. 3·039	+ 1·3923	+ 0·0031	— 0·0018
193	72 Ophiuchi	3·9	89·17	82·30	36	85	8·047	8·042	18. 2. 8·047	+ 2·8476	+ 0·0019	— 0·0056
194	13 Sagittarii ....μ	4·1	90·51	82·09	7	23	11·051	11·052	18. 7. 11·051	+ 3·5878	+ 0·0009	— 0·0014
195	23 Ursæ Minoris ....δ „ S.P. ...	4·3	88·98 90·03	82·35	59 30	198	47·598 47·321	47·332	18. 7. 47·505	—19·4956	— 0·2230	+ 0·0251
196	58 Serpentis ....η	3·4	89·47	83·55	34	49	37·022	37·028	18. 15. 37·022	+ 3·1406	+ 0·0009	— 0·0400

172. The magnitude given is taken from Struve's *Mensuræ Micrometricæ*.
174. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·6.
179. The magnitude given in the *Uranometria Nova Oxoniensis* is 2·6.

Mean Date. 1800+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				"	"	° ′ "	"	"	"		
90·08	83·74	5	21	28·24	27·32	104. 44. 27·78	+13·098	− 0·373	− 0·013	30 Libræ……………o^2	165
89·41	82·74	9	22	57·05	57·38	106. 19. 57·18	+12·753	− 0·384	+ 0·046	32 Libræ……………ζ^1	166
89·50	82·16	38	71	53·05	53·79	62. 54. 53·05	+12·206	− 0·298	+ 0·094	5 Coronæ ……………α	167
90·35	81·96	35	29	40·63	40·54	83. 13. 40·63	+11·585	− 0·355	− 0·056	24 Serpentis ……………α	168
89·56	83·52	22	25	26·79	26·71	85. 11. 26·79	+11·117	− 0·366	− 0·059	37 Serpentis ……………ϵ	169
89·46	82·86	12	28	2·60	2·60	11. 52. 2·50	+10·923	+ 0·275	+ 0·004	16 Ursæ Minoris ……ζ	170
89·01		7		2·33						,, S.P.…	
89·09	81·68	15	14	44·24	44·79	73. 58. 44·24	+10·673	− 0·343	+ 1·286	41 Serpentis……………γ	171
90·23	83·42	16	26	13·64	13·88	109. 30. 13·64	+10·099	− 0·442	+ 0·027	8 Scorpii ……………β^1	172
88·77	84·00	24	37	38·49	38·26	93. 24. 38·49	+ 9·370	− 0·409	+ 0·137	1 Ophiuchi ……………δ	173
88·49	81·68	12	41	17·58	17·37	70. 35. 17·58	+ 8·706	− 0·351	− 0·048	20 Herculis……………γ	174
88·36	81·62	3	45	12·29	12·31	28. 14. 12·25	+ 8·276	− 0·110	− 0·050	14 Draconis……………η	175
90·88		2		11·78						,, S.P. ………	
90·19	81·79	9	32	15·09	14·14	116. 11. 14·64	+ 8·263	− 0·491	+ 0·028	21 Scorpii ……………α	176
89·59	83·58	10	21	29·18	29·63	87. 46. 29·18	+ 8·047	− 0·407	+ 0·065	10 Ophiuchi ……………λ	177
89·45	82·82	23	23	37·55	37·66	100. 20. 37·55	+ 7·585	− 0·448	− 0·035	13 Ophiuchi ……………ζ	178
89·27	81·33	16	56	52·10	51·36	58. 11. 52·10	+ 7·092	− 0·316	− 0·410	40 Herculis ……………ζ	179
89·21	83·62	24	44	12·98	13·23	80. 27. 12·98	+ 5·825	− 0·401	− 0·015	27 Ophiuchi ……………κ	180
88·56	80·91	11	38	40·44	40·58	58. 54. 40·44	+ 5·521	− 0·324	− 0·032	58 Herculis ……………ϵ	181
89·32	82·17	19	21	57·53	57·99	7. 46. 57·42	+ 5·423	+ 0·894	+ 0·003	22 Ursæ Minoris ……ϵ	182
89·40		6		57·06						,, S.P.…	
89·65	82·84	35	24	17·34	17·40	105. 35. 17·34	+ 4·845	− 0·488	− 0·097	35 Ophiuchi ……………η	183
89·50	80·90	29	38	1·86	2·10	75. 29. 1·86	+ 4·371	− 0·391	− 0·030	64 Herculis ……………α^1	184
89·30	81·59	13	24	21·05	20·62	114. 53. 21·05	+ 3·891	− 0·528	+ 0·035	42 Ophiuchi ……………θ	185
89·36	82·80	35	26	48·63	48·89	85. 45. 48·63	+ 3·392	− 0·429	− 0·015	49 Ophiuchi ……………σ	186
88·47	82·31	8	25	1·39	1·17	37. 37. 1·30	+ 2·796	− 0·197	− 0·004	23 Draconis……………β	187
87·96		1		1·38						,, S.P. ………	
89·39	82·27	65	79	34·10	34·40	77. 21. 34·10	+ 2·633	− 0·402	+ 0·217	55 Ophiuchi ……………α	188
89·86	83·55	42	45	10·37	10·89	85. 23. 10·37	+ 1·918	− 0·431	− 0·167	60 Ophiuchi ……………β	189
89·13	82·47	21	49	52·58	52·63	62. 12. 52·58	+ 1·559	− 0·345	+ 0·745	86 Herculis……………μ	190
89·21	82·78	5	20	55·61	55·84	63. 55. 55·73	+ 0·789	− 0·353	− 0·009	89 Herculis ……………	191
90·72	81·95	13	46	52·68	52·49	38. 29. 52·68	+ 0·521	− 0·203	+ 0·028	33 Draconis…………… γ	192
88·80	83·14	27	37	5·00	5·30	80. 27. 5·00	− 0·188	− 0·415	− 0·089	72 Ophiuchi ……………	193
90·82	82·29	11	19	13·59	13·53	111. 5. 13·59	− 0·628	− 0·523	− 0·001	13 Sagittarii ……………μ	194
89·32	81·89	171	589	17·92	18·46	3. 23. 18·05	− 0·681	+ 2·841	− 0·040	23 Ursæ Minoris ……δ	195
89·26		61		18·41						,, S.P.…	
89·41	84·53	30	38	36·98	36·77	92. 55. 36·98	− 1·366	− 0·456	+ 0·677	58 Serpentis ……………η	196

184. The limits of magnitude are 3·1 and 3·9; the period irregular.
185. The magnitude given in the *Uranometria Nova Oxoniensis* is 2·8.

No.	Star's Name.	Mag.	Mean Date. 1800+ 1887 to 1891.	Mean Date. 1800+ 10-Year Catalogue.	No of Observations. 1887 to 1891.	No of Observations. 10-Year Catalogue.	Seconds of Mean R.A. 1890·0 deduced from 1887 to 1891.	Seconds of Mean R.A. 1890·0 deduced from 10-Year Catalogue.	Adopted Mean R.A. 1890·0.	Annual Precession. 1890·0.	Secular Variation. 1890·0.	Annual Proper Motion. 1890·0.
							s	s	h m s	s	s	s
197	22 Sagittarii ....λ	3·1	89·80	82·56	11	37	10·867	10·893	18. 21. 10·867	+ 3·7070	— 0·0013	— 0·0052
198	3 Lyræ ....α	0·2	89·38	82·23	75	190	12·821	12·808	18. 33. 12·821	+ 2·0135	+ 0·0016	+ 0·0173
199	2 Aquilæ	4·8	89·47	83·07	13	78	14·994	15·020	18. 36. 14·994	+ 3·2853	— 0·0010	— 0·0004
200	10 Lyræ ....β^1	Var.	90·19	81·65	12	26	1·107	1·092	18. 46. 1·107	+ 2·2142	+ 0·0015	— 0·0007
201	13 Aquilæ ....ϵ	4·1	89·13	82·88	28	60	37·761	37·756	18. 54. 37·761	+ 2·7264	+ 0·0005	— 0·0049
202	17 Aquilæ ....ζ	3·1	89·75	82·95	28	54	21·231	21·219	19. 0. 21·231	+ 2·7578	+ 0·0003	— 0·0026
203	42 Sagittarii ....ψ	5·2	89·81	82·62	9	26	47·708	47·692	19. 8. 47·701	+ 3·6801	— 0·0078	+ 0·0004
204	25 Aquilæ ....ω	5·1	89·28	82·82	24	40	39·157	39·158	19. 12. 39·157	+ 2·8164	— 0·0003	— 0·0014
205	30 Aquilæ ....δ	3·5	89·58	82·55	33	47	57·101	57·080	19. 19. 57·101	+ 3·0089	— 0·0017	+ 0·0153
206	6 Vulpeculæ ....α	4·7	89·40	82·60	19	58	7·675	7·657	19. 24. 7·675	+ 2·5054	+ 0·0009	— 0·0108
207	38 Aquilæ ....μ	4·7	89·81	82·31	13	34	42·919	42·901	19. 28. 42·919	+ 2·9173	— 0·0013	+ 0·0129
208	52 Sagittarii ....h^2	4·6	90·30	82·21	10	21	0·788	0·761	19. 30. 0·788	+ 3·6518	— 0·0103	+ 0·0016
209	Ursæ Minoris ......λ	6·5	89·39	82·21	65	174	35·318	34·038	19. 33. 34·968	—64·9749	—28·4562	— 0·0523
	„ S.P. ...		89·79		18		33·705					
210	54 Sagittarii ....e^1	5·5*	90·73	81·48	11	19	25·239	25·274	19. 34. 25·239	+ 3·4365	— 0·0074	+ 0·0026
211	50 Aquilæ ....γ	2·8	89·97	81·40	20	46	1·764	1·767	19. 41. 1·764	+ 2·8517	— 0·0010	— 0·0005
212	53 Aquilæ ....α	1·0	89·62	81·77	41	85	24·937	24·941	19. 45. 24·937	+ 2·8919	— 0·0014	+ 0·0351
213	60 Aquilæ ....β	4·0	88·88	83·29	19	35	54·544	54·530	19. 49. 54·544	+ 2·9450	— 0·0020	+ 0·0007
214	62 Sagittarii c	4·7	89·41	81·06	10	23	53·587	53·616	19. 55. 53·587	+ 3·6947	— 0·0147	+ 0·0004
215	65 Aquilæ ....θ	3·4	89·66	81·87	30	57	37·713	37·707	20. 5. 37·713	+ 3·0954	— 0·0042	— 0·0001
216	6 Capricorni ....α^2	3·8	90·02	80·87	19	38	57·066	57·060	20. 11. 57·066	+ 3·3289	— 0·0085	+ 0·0022
217	9 Capricorni ....β	3·4	90·05	82·73	9	31	49·797	49·837	20. 14. 49·816	+ 3·3731	— 0·0096	+ 0·0008
218	11 Capricorni ....ρ	5·0	89·32	82·10	12	28	35·164	35·129	20. 22. 35·164	+ 3·4293	— 0·0114	— 0·0028
219	2 Delphini ....ϵ	4·1	89·99	82·05	25	33	57·428	57·431	20. 27. 57·428	+ 2·8663	— 0·0113	— 0·0006
220	Bradley 2701	7·5*	90·04	83·32	59	4	44·984	44·973	20. 33. 45·054	— 3·5841	— 0·3949	+ 0·0183
	„ S.P. ...		90·11		19		45·276					
221	9 Delphini ....α	4·0	89·47	81·98	9	32	31·687	31·699	20. 34. 31·692	+ 2·7824	— 0·0001	+ 0·0031
222	50 Cygni ....α	1·5	89·85	81·90	5	26	40·895	40·845	20. 37. 40·866	+ 2·0437	+ 0·0022	— 0·0003
223	2 Aquarii ....ϵ	3·8	89·89	82·08	20	24	43·249	43·258	20. 41. 43·249	+ 3·2501	— 0·0084	— 0·0002
224	6 Aquarii ....μ	4·8	89·87	82·44	18	26	43·210	43·197	20. 46. 43·210	+ 3·2377	— 0·0083	+ 0·0008
225	32 Vulpeculæ	5·1	89·50	82·94	20	19	52·295	52·289	20. 49. 52·295	+ 2·5560	+ 0·0026	— 0·0016
226	23 Capricorni ....θ	4·3	89·14	82·95	12	34	45·803	45·772	20. 59. 45·803	+ 3·3739	— 0·0128	+ 0·0040
227	61 Cygni (1st Star)......	5·0*	90·72	83·63	3	14	57·970	57·918	21. 1. 57·934	+ 2·3348	+ 0·0044	+ 0·3444
228	64 Cygni ....ζ	3·5	89·82	82·41	27	59	15·265	15·260	21. 8. 15·265	+ 2·5515	+ 0·0039	— 0·0015
229	8 Equulei ....α	4·1	89·40	82·74	13	15	19·480	19·478	21. 10. 19·480	+ 2·9969	— 0·0028	+ 0·0021
230	5 Cephei ....α	2·6	89·21	81·90	10	39	57·172	57·149	21. 15. 57·154	+ 1·4143	— 0·0072	+ 0·0211
	„ S.P.		88·71		8		57·131					

200. The limits of magnitude are 3·4 and 4·5 ; the period about $12^{d}\cdot 22^{h}$.
206. The letter α was added in the B.A.C.
207. The magnitude given in the *Uranometria Nova Oxoniensis* is 5·1.
213. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·7.

Mean Date. 1800+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				"	"	° ′ "	"	"	"		
89·63	82·44	9	35	54·96	54·77	115. 28. 54·86	− 1·851	− 0·538	+ 0·198	22 Sagittarii ....λ	197
89·22	81·30	76	217	6·44	6·40	51. 19. 6·44	− 2·897	− 0·289	− 0·295	3 Lyræ ....α	198
89·72	84·40	27	80	26·00	25·85	99. 9. 26·00	− 3·158	− 0·472	− 0·005	2 Aquilæ..................	199
90·35	80·89	11	33	53·13	52·71	56. 45. 53·13	− 4·000	− 0·315	− 0·017	10 Lyræ..................β^1	200
89·60	81·81	24	58	51·02	50·49	75. 4. 51·02	− 4·735	− 0·385	+ 0·080	13 Aquilæ ....ε	201
89·62	82·79	48	73	58·76	59·10	76. 17. 58·76	− 5·221	− 0·386	+ 0·089	17 Aquilæ ....ζ	202
89·71	83·00	9	22	44·75	44·59	115. 26. 44·69	− 5·930	− 0·511	+ 0·029	42 Sagittarii ....ψ	203
89·24	83·01	27	25	9·36	9·57	78. 36. 9·36	− 6·251	− 0·388	− 0·025	25 Aquilæ ....ω	204
89·32	83·31	34	36	14·87	14·64	87. 6. 14·87	− 6·855	− 0·410	− 0·091	30 Aquilæ ....δ	205
89·03	82·13	28	40	27·20	27·23	65. 33. 27·20	− 7·198	− 0·338	+ 0·102	6 Vulpeculæ...........α	206
89·37	83·38	24	22	15·05	15·33	82. 51. 15·05	− 7·570	− 0·391	+ 0·133	38 Aquilæ ....μ	207
90·88	81·62	10	20	32·87	33·34	115. 7. 32·87	− 7·675	− 0·489	+ 0·010	52 Sagittarii ....h^2	208
89·29 89·27	82·34	145 82	489	59·02 59·51	59·37	1. 1. 59·19	− 7·963	+ 8·702	+ 0·005	Ursæ Minoris ......λ „ S.P....	209
91·04	82·37	11	22	41·92	42·10	106. 32. 41·92	− 8·031	− 0·456	+ 0·039	54 Sagittarii ....e^1	210
89·91	81·52	10	24	16·31	16·42	79. 39. 16·31	− 8·556	− 0·373	− 0·008	50 Aquilæ ....γ	211
89·41	82·25	30	59	19·12	19·04	81. 25. 19·12	− 8·903	− 0·375	− 0·384	53 Aquilæ ....α	212
89·43	83·81	13	28	3·32	3·08	83. 52. 3·32	− 9·253	− 0·378	+ 0·473	60 Aquilæ ....β	213
89·45	80·67	8	12	55·18	54·81	118. 0. 55·08	− 9·715	− 0·468	− 0·024	62 Sagittarii c	214
89·55	83·18	33	52	50·35	50·20	91. 8. 50·35	−10·450	− 0·381	− 0·014	65 Aquilæ ....θ	215
89·48	82·28	13	19	8·04	7·41	102. 53. 8·04	−10·918	− 0·403	− 0·017	6 Capricorni ....α^2	216
88·76	83·05	9	33	41·43	42·45	105. 7. 41·91	−11·129	− 0·405	− 0·022	9 Capricorni............β	217
89·57	82·50	6	23	37·11	36·79	108. 10. 36·95	−11·687	− 0·402	+ 0·007	11 Capricorni............ρ	218
90·05	83·09	23	23	13·43	13·66	79. 4. 13·43	−12·066	− 0·329	+ 0·022	2 Delphini...............ε	219
89·97 90·05	83·76	65 24	7	24·06 24·18	24·76	8. 56. 24·09	−12·468	+ 0·415	0·000	Bradley 2701 .... „ S.P. ...	220
88·43	81·68	5	25	32·55	33·04	74. 28. 32·82	−12·520	− 0·312	+ 0·002	9 Delphini...............α	221
89·21	81·85	3	27	45·03	45·65	45. 6. 45·54	−12·734	− 0·225	− 0·003	50 Cygni ....α	222
90·31	83·68	13	26	53·49	53·30	99. 53. 53·49	−13·006	− 0·356	+ 0·027	2 Aquarii ....ε	223
89·57	83·53	15	26	44·44	45·08	99. 23. 44·44	−13·335	− 0·348	+ 0·031	6 Aquarii ....μ	224
89·10	83·35	17	27	37·82	38·05	62. 21. 37·82	−13·540	− 0·270	+ 0·002	32 Vulpeculæ	225
88·60	82·59	12	22	10·98	10·97	107. 40. 10·98	−14·165	− 0·343	+ 0·054	23 Capricorni........ ...θ	226
90·50	83·65	4	15	29·18	29·23	51. 47. 29·21	−14·297	− 0·233	− 3·230	61 Cygni (1st Star)......	227
89·71	82·05	27	51	26·58	26·84	60. 13. 26·58	−14·682	− 0·248	+ 0·066	64 Cygni ....ζ	228
89·29	83·11	9	18	23·80	24·15	85. 12. 23·93	−14·804	− 0·289	+ 0·078	8 Equulei ....α	229
89·17 88·83	81·81	16 8	77	49·00 49·96	49·92	27. 52. 49·25	−15·132	− 0·129	− 0·025	5 Cephei ....α „ S.P.	230

219. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·6.
228. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·1.

No.	Star's Name.	Mag.	Mean Date. 1800+		No. of Observations.		Seconds of Mean R.A. 1890·0 deduced from		Adopted Mean R.A.	Annual Precession.	Secular Variation.	Annual Proper Motion.
			1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.
							s	s	h m s	s	s	s
231	32 Capricorni ....ι	4·4	89·39	82·06	18	22	7·265	7·275	21. 16. 7·265	+ 3·3455	— 0·0130	— 0·0003
232	Groombridge 3548 ...	7·4	89·93	86·83	43	3	28·509	26·920	21. 21. 28·439	—11·1979	— 3·1894	...
	,, S.P.		90·18		7		28·012					
233	22 Aquarii ....β	3·1	90·46	83·23	13	41	46·056	46·041	21. 25. 46·056	+ 3·1609	— 0·0071	— 0·0006
234	8 Cephei ....β²	3·0	88·92	81·96	2	39	14·281	14·263	21. 27. 14·304	+ 0·7918	— 0·0346	+ 0·0012
	,, S.P.		89·82		3		14·455					
235	23 Aquarii ....ξ	4·8	89·20	83·43	17	38	53·731	53·742	21. 31. 53·731	+ 3·1906	— 0·0082	+ 0·0058
236	8 Pegasi ....ε	2·4	89·14	82·64	19	39	46·944	46·971	21. 38. 46·944	+ 2·9450	— 0·0005	+ 0·0008
237	49 Capricorni ....δ	3·0	89·46	81·87	13	14	58·117	58·142	21. 40. 58·117	+ 3·3001	— 0·0127	+ 0·0166
238	16 Pegasi	5·0	89·52	82·54	16	46	3·365	3·396	21. 48. 3·365	+ 2·7267	+ 0·0053	— 0·0005
239	34 Aquarii ....α	3·2	89·44	82·85	32	36	7·996	8·018	22. 0. 7·996	+ 3·0825	— 0·0041	— 0·0008
240	24 Pegasi ....ι	4·0	89·42	81·07	14	25	53·372	53·391	22. 1. 53·372	+ 2·7679	+ 0·0060	+ 0·0209
241	43 Aquarii ....θ	4·3	89·55	82·09	20	35	1·706	1·717	22. 11. 1·706	+ 3·1621	— 0·0076	+ 0·0057
242	48 Aquarii ....γ	4·1	89·46	81·52	18	27	58·429	58·456	22. 15. 58·429	+ 3·0924	— 0·0042	+ 0·0068
243	Bradley 2993	5·4	90·21	85·85	56	5	58·914	58·352	22. 21. 58·888	— 4·0597	— 1·2729	+ 0·0530
	,, S.P....		90·21		27		58·833					
244	57 Aquarii ....σ	4·8	88·93	81·62	6	22	49·498	49·546	22. 24. 49·522	+ 3·1797	— 0·0088	— 0·0011
245	62 Aquarii ....η	4·2	89·58	82·55	19	32	42·170	42·195	22. 29. 42·170	+ 3·0786	— 0·0031	+ 0·0042
246	42 Pegasi..................ζ	3·6	89·46	81·12	23	27	58·506	58·532	22. 35. 58·506	+ 2·9857	+ 0·0023	+ 0·0044
247	48 Pegasi..................μ	3·7	89·68	82·17	19	54	41·612	41·624	22. 44. 41·612	+ 2·8802	+ 0·0090	+ 0·0096
248	73 Aquarii ....λ	3·8	89·42	81·51	15	42	52·507	52·519	22. 46. 52·507	+ 3·1327	— 0·0063	— 0·0016
249	24 Piscis Australis ...α	1·3	89·92	83·08	7	26	34·288	34·261	22. 51. 34·275	+ 3·3014	— 0·0210	+ 0·0232
250	54 Pegasi ....α	2·6	90·08	82·13	23	46	16·850	16·862	22. 59. 16·850	+ 2·9812	+ 0·0057	+ 0·0028
251	6 Piscium ....γ	3·8	89·65	82·84	23	38	27·730	27·740	23. 11. 27·730	+ 3·0594	+ 0·0005	+ 0·0487
252	8 Piscium ....κ	5·0	89·51	82·19	17	44	17·574	17·582	23. 21. 17·574	+ 3·0699	0·0000	+ 0·0041
253	Bradley 3147	5·6	90·23	85·18	56	6	49·643	48·884	23. 27. 49·517	— 0·1737	— 0·5678	+ 0·0856
	,, S.P. ...		89·94		35		49·315					
254	17 Piscium ....ι	4·3	89·80	82·76	29	40	17·479	17·496	23. 34. 17·479	+ 3·0593	+ 0·0030	+ 0·0234
255	35 Cephei ....γ	3·4	90·86	82·66	2	37	49·740	50·119	23. 34. 50·083	+ 2·4370	+ 0·0753	— 0·0199
	,, S.P.		87·34		1		50·078					
256	Sculptoris ....δ	4·6	89·54	81·46	8	20	11·777	11·761	23. 43. 11·771	+ 3·1262	— 0·0161	+ 0·009
257	28 Piscium ....ω	4·2	89·59	82·02	28	47	39·707	39·707	23. 53. 39·707	+ 3·0685	+ 0·0047	+ 0·0087
258	2 Ceti	4·6	89·30	82·71	19	28	6·269	6·233	23. 58. 6·269	+ 3·0761	— 0·0080	— 0·0001

234. The magnitude given is taken from Struve's *Mensuræ Micrometricæ*.
246. The magnitude given in the *Uranometria Nova Oxoniensis* is 3·3.

Mean Date. 1800+		No. of Observations.		Seconds of Mean N.P.D. 1890·0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890·0.	1890·0.	1890·0.	1890·0.		
				″	″	° ′ ″	″	″	″		
89·56	81·74	15	19	10·07	10·11	107. 18. 10·07	−15·141	− 0·314	− 0·013	32 Capricorni ....ι	231
89·92	86·48	28	7	9·19	9·47	3. 25. 9·32	−15·446	+ 1·048	...	Groombridge 3548 ...	232
90·16		6		9·94						„ S.P.	
89·90	83·52	9	36	17·74	17·51	96. 3. 17·62	−15·681	− 0·281	+ 0·001	22 Aquarii ....β	233
88·77	82·07	6	74	19·51	20·10	19. 55. 19·49	−15·760	− 0·065	+ 0·012	8 Cephei ....β²	234
90·09		6		19·47						„ S.P............	
89·83	84·02	15	38	49·94	50·38	98. 20. 49·94	−16·010	− 0·274	+ 0·022	23 Aquarii ....ξ	235
89·99	83·88	21	37	45·18	45·21	80 37. 45·18	−16·366	− 0·242	− 0·011	8 Pegasi..................ε	236
88·95	80·68	9	10	34·82	34·26	106. 37. 34·68	−16·475	− 0·268	+ 0·297	49 Capricorni...........δ	237
89·45	83·31	14	52	31·92	32·26	64. 35. 31·92	−16·821	− 0·210	+ 0·002	16 Pegasi	238
89·37	83·85	24	34	14·45	14·29	90. 51. 14·45	−17·373	− 0·218	− 0·002	34 Aquarii ....α	239
89·41	81·26	13	33	30·56	31·76	65. 11. 30·56	−17·448	− 0·192	− 0·020	24 Pegasi..................ι	240
89·86	82·08	22	33	51·44	51·29	98. 19. 51·44	−17·829	− 0·204	+ 0·019	43 Aquarii ....θ	241
90·12	81·80	16	13	29·10	29·25	91. 56. 29·10	−18·023	− 0·191	− 0·017	48 Aquarii ....γ	242
89·94	85·59	36	9	45·09	45·51	4. 26. 45·26	−18·248	+ 0·253	− 0·044	Bradley 2993	243
89·78		17		45·61						„ S.P....	
88·94	81·95	10	17	26·36	27·12	101. 14. 26·36	−18·349	− 0·180	+ 0·037	57 Aquarii ....σ	244
89·43	82·12	20	15	3·57	3·56	90. 41. 3·57	−18·517	− 0·165	+ 0·053	62 Aquarii ....η	245
89·67	82·21	25	15	34·12	34·52	79. 44. 34·12	−18·721	− 0·149	+ 0·018	42 Pegasi..................ζ	246
89·94	82·51	13	41	44·61	45·30	65. 58. 44·61	−18·981	− 0·128	+ 0·042	48 Pegasi..................μ	247
89·54	82·40	14	42	53·96	53·62	98. 9. 53·96	−19·042	− 0·136	− 0·040	73 Aquarii ....λ	248
89·97	82·68	7	29	19·44	19·07	120. 12. 19·25	−19·167	− 0·135	+ 0·159	24 Piscis Australis......α	249
89·51	83·18	14	30	11·47	11·83	75. 23. 11·47	−19·354	− 0·106	+ 0·030	54 Pegasi..................α	250
89·37	83·08	14	44	7·73	7·62	87. 19. 7·73	−19·606	− 0·086	− 0·017	6 Piscium ....γ	251
89·28	82·53	15	37	47·66	48·00	89. 20. 47·66	−19·768	− 0·068	+ 0·102	8 Piscium ....κ	252
89·92	85·24	45	18	57·42	58·07	3. 17. 57·46	−19·857	+ 0·012	− 0·003	Bradley 3147	253
89·75		35		57·50						„ S.P....	
89·40	83·42	14	27	12·04	11·90	84. 58. 12·04	−19·927	− 0·042	+ 0·443	17 Piscium ....ι	254
89·42	82·41	9	68	52·63	53·69	12. 58. 52·80	−19·933	− 0·031	− 0·135	35 Cephei..................γ	255
88·90		15		52·95						„ S.P.	
89·70	83·19	8	14	19·88	20·31	118. 44. 20·02	−20·000	− 0·026	+ 0·097	Sculptoris ....δ	256
90·16	81·88	24	38	44·42	44·83	83. 44. 44·42	−20·046	− 0·005	+ 0·108	28 Piscium ....ω	257
89·33	82·76	8	20	55·32	54·43	107. 56. 54·98	−20·053	+ 0·004	− 0·005	2 Ceti	258

250. The magnitude given in the *Uranometria Nova Oxoniensis* is 2·3.
256. Authority for Proper Motion : Cape Catalogue, 1880.